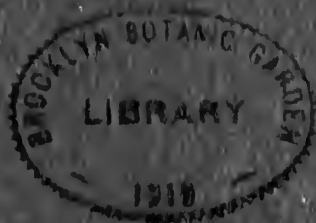


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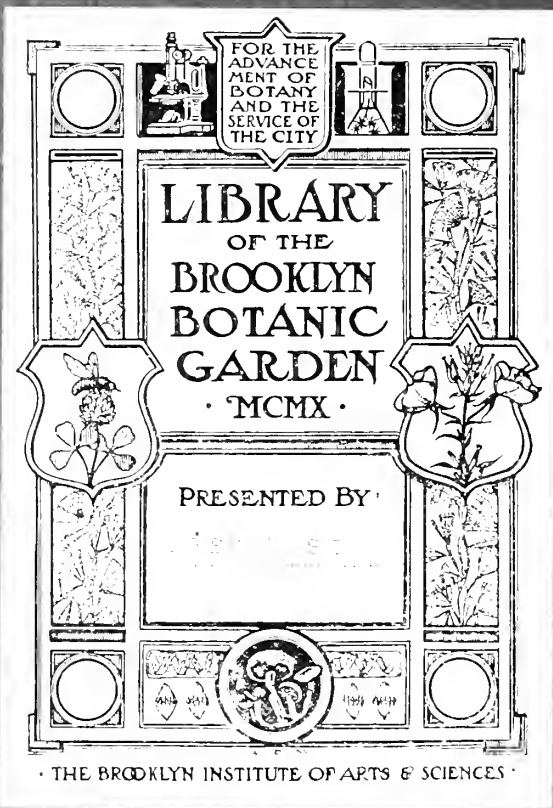
**TREES AND SHRUBS**

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**GRAVES AND RUSK**



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GUIDE TO  
TREES AND SHRUBS  
*Based on those of Greater New York*  
*Native, Naturalized, and*  
*Commonly Cultivated Exotic Kinds*

BY

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AND

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FOURTH PRINTING OF  
A TEACHING GUIDE TO THE TREES AND SHRUBS OF  
GREATER NEW YORK, INCLUDING THE KINDS MOST  
COMMONLY SEEN IN CULTIVATION.

*(with a few minor changes)*

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*To our Students  
who have inspired us  
and kept us alert*

24122



MAP SHOWING THE GREATER NEW YORK REGION.

The numbers correspond to those of the Pathfinder beginning on the next page.  
 (The 8th Avenue Subway is not shown on this map.)



## PATHFINDER \*

### HOW TO REACH THE MOST IMPORTANT PARKS AND WOODLANDS OF THE GREATER NEW YORK REGION

The cost of each trip is figured on the basis of Grand Central Station or Times Square, Manhattan, as the starting point. The numbers correspond to those on the map facing this page.

1. Bay Terrace, Staten Island (Richmond). Ferry to Staten Island from South Ferry Slip, at the southern end of Manhattan. (South Ferry Station of I.R.T. or Whitehall Station of B.M.T. Subway.) From landing at Staten Island (St. George) take Staten Island Rapid Transit R.R. (electric train) at east side of station, upstairs. Get round trip ticket for Bay Terrace. Cost: about \$1.

2. Brooklyn Botanic Garden. Broadway-7th Avenue or 7th Avenue I.R.T. Subway to Eastern Parkway-Brooklyn Museum Station, or Lexington Avenue I.R.T. Subway to Nevins Street, Brooklyn, there changing to 7th Avenue train; or B.M.T. Subway, Brighton Line, to Prospect Park Station. Cost: 20 cents.

3. Central Park, Manhattan (north end of park). 7th Avenue (Bronx Park) I.R.T. Subway or 8th Avenue Independent Subway to 110th Street Station. Cost: 20 cents.

4. Coytesville, New Jersey. Broadway-7th Avenue I.R.T. or 8th Avenue Independent Subway to 168th Street. Public Service Bus No. 86 across George Washington Bridge to north end of Coytesville. Cost: 40 cents.

Cunningham Park, Queens. See 7.

5. Forest Park, Queens. Take 8th Avenue Independent Subway to Woodhaven Boulevard; then bus along Woodhaven Boulevard to Myrtle Avenue. Or 8th Avenue Subway to Union Turnpike; walk southwest on Union Turnpike. Or B.M.T. Subway to Forest Parkway, or Woodhaven Boulevard, or 102nd Street; walk north. Cost: 20 or 35 cents.

6. Fresh Kills, Staten Island. Ferry to Staten Island from South Ferry Slip, Manhattan. From landing at Staten Island (St. George) take Richmond bus to Arthur Kill Road. Cost: about 60 cents.

7. Cunningham Park, Queens. Eighth Avenue Subway to 169th Street, Jamaica. Bus along Hillside Avenue to 212th Street. Walk under parkway drive into park. Cost: 35 cents.

\* Adapted from a circular issued to Brooklyn Botanic Garden field classes.

8. Inwood Park, Manhattan. Broadway-7th Avenue I.R.T. or 8th Avenue Independent Subway to Dyckman Street Station. Walk west along Dyckman Street to Payson Avenue, and turn right on Payson Avenue. Cost: 20 cents.

9. Kissena Park, Flushing (Queens). Flushing Subway from Times Square or Grand Central, I.R.T. or B.M.T. (lowest level), to end of line. At Main Street and Roosevelt Avenue take bus Q65 to east end of lake in Kissena Park. Cost: about 35 cents.

10. New York Botanical Garden, Bronx. Lexington Avenue or 7th Avenue I.R.T. Subway (marked "180th Street" or "241st Street White Plains Road") to 149th Street-3d Avenue Station; then take Third Avenue Elevated to the Bronx Park or the 200th Street Station. Cost: 20 cents.

11. Palisades of the Hudson, New Jersey. Broadway-7th Avenue I.R.T. Subway or 8th Avenue Independent Subway to Dyckman Street. Walk west on Dyckman Street. Take Englewood Ferry to base of Palisades. Cost: 35 cents.

12. Pelham Bay Park, Bronx. Lexington Avenue I.R.T. Subway, Pelham Bay Park Branch, to end of line. Cost: 20 cents.

13. Prospect Park, Brooklyn (north end). Broadway-7th Avenue or 7th Avenue I.R.T. Subway to Grand Army Plaza, or Brighton Line of B.M.T. to 7th Avenue Station. Cost: 20 cents.

14. Van Cortlandt Park, East (Bronx). Lexington Avenue I.R.T. Subway, Woodlawn Branch, to end of line. Cost: 20 cents.

15. Van Cortlandt Park, West. Broadway-7th Avenue I.R.T. Subway, Van Cortlandt Park Branch, to end of line. Trolley about  $\frac{1}{2}$  mile north to Mosholu Avenue and Broadway. Cost: 35 cents.

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## INTRODUCTION TO THE FIRST PRINTING

Although the list of books on trees and shrubs is already a long one, the authors believe that publication of this new handbook is much needed for the following reasons:

1. There are very few books which deal to any extent with both the winter and the summer characters of woody plants.

2. Very few books include both the shrubs and the trees.

3. Only rarely are the commoner exotic or foreign species included. This is unfortunate for those who live in large cities, where, in the parks and gardens, these exotic species are often as commonly planted as the native ones.

4. Although many of the States have issued publications of various sorts dealing with their native woody plants, no book has yet appeared which treats of the trees and shrubs of Greater New York. Few people realize the extent of the area covered by the Greater City. With its five boroughs, Manhattan, The Bronx, Queens, Brooklyn, and Richmond (Staten Island), the total area is 308.95 square miles, about one-fourth the size of the State of Rhode Island.

The authors have endeavored to fill these needs in this book. It deals with both summer and winter characters of shrubs as well as of trees; and includes the common exotic species as well as those which are native or naturalized in Greater New York.

The book is the result of a gradual development. For eight years, mimeographed outlines have been distributed to the members of the tree and shrub classes at the Brooklyn Botanic Garden. These outlines contained a summary, in a form as brief as possible, of the distinctive characters of each species studied. This summary has been amplified to some extent for the present edition; but lengthy, technical descriptions have been avoided, and only those features have been included which are significant as diagnostic characters. The few technical terms which are used are considered a necessary part of the student's vocabulary. A glossary of these terms will be found on pages 67 to 70. The numbered species are those which are considered more important, in most cases because they are of more frequent occurrence. Others of lesser importance are noted in small type. Also in small type are mentioned some species not found in Greater New York, but of frequent occurrence near by.

For those who may desire to use this handbook but who do not attend the Brooklyn Botanic Garden classes, there are keys for the identification

of the genera, one based on summer and the other on winter characters; also a section explaining the nature of these characters, as well as suggestions regarding the use of the keys.

In the section on "Distinguishing Characters":

Names in **heavy type** are of species native or naturalized (i.e. grow "wild") in Greater New York.

Names starred are of species native or naturalized in North America but found in Greater New York only in cultivation.

Names neither in heavy type nor starred are of foreign species not naturalized and found only in cultivation in Greater New York. The parts of the world in which they are native are usually mentioned.

<sup>o</sup> before a name indicates a shrub.

<sup>oo</sup> before a name indicates a climber.

All names not thus marked are of species classed as trees.

The scientific name of each plant is followed by an abbreviation of the name of the botanist or botanists responsible for naming the plant. The explanation of these abbreviations may be found in any of the standard manuals.

As an aid to the pronunciation of the scientific names, the syllable to be accented is marked; two accents are used: the grave (`) to indicate the long English sound of the vowel, the acute (') for the short sound.

The following abbreviations are used for words constantly recurring in the descriptions, in addition to the familiar ones used for feet, inches, and the various States:

*br.*—branch.

*brt.*—branchlet.

*cult.*—cultivated or cultivation.

*fl.*—flower.

*fr.*—fruit.

*lf.*—leaf.

*lft.*—leaflet.

*L. I.*—Long Island.

*lvs.*—leaves.

*nr.*—near.

*S. I.*—Staten Island.

*var.*—variety.

Some of the localities in Greater New York and vicinity where the species may be found have usually been added at the end of the descriptions. These lists do not aim at completeness, but merely direct one to some of the good specimens available.

The names of these localities have been abbreviated as follows:

B.B.G.—Brooklyn Botanic Garden.

B.Ter.—Bay Terrace, Staten Island.

C.Pk.—Central Park, Manhattan.

For.Pk.—Forest Park, Queens.

Inw.—Inwood Park, Manhattan.

Kis.Pk.—Kissena Park, Queens.

N.Y.B.G.—New York Botanical Garden.

Pal.—Palisades of the Hudson, near Englewood, N. J.

Pel.Pk.—Pelham Bay Park, The Bronx.

Pros.Pk.—Prospect Park, Brooklyn.

V.C.Pk.—Van Cortlandt Park, The Bronx.

The authors are pleased to acknowledge their indebtedness for the illustrations to Miss Maud H. Purdy of the Brooklyn Botanic Garden.

BROOKLYN, NEW YORK

September, 1932.

## INTRODUCTION TO THE THIRD PRINTING

In the fourteen years since this book was first published, the characteristics of the trees and shrubs have not changed, but the transportation facilities of the City have been greatly enlarged, and numerous new books have been written on trees and shrubs. It has been necessary, therefore, to revise the pathfinder (p. v) and the list of reference books (p. 71). Also, our students have called our attention to the omission of two native woody plants—*Gaultheria procumbens* and *Ceanothus americanus*—and to the need of including the page numbers in the keys. The keys themselves could doubtless be improved, for there are many possible ways of making an artificial key to the same list of plants, and we have no reason for imagining that we have discovered the one best way. But no significant change has been made in the keys except where it was necessary for the inclusion of the two additional species.

Any further suggestions from users of the book will be welcome.

BROOKLYN, NEW YORK  
JULY, 1947.

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## INTRODUCTION TO THE FOURTH PRINTING

The original title of this book, "A Teaching Guide to the Trees and Shrubs of Greater New York," was suggested by the original use of the class outlines on which it was based. Through the first three printings, however, it has become increasingly evident that the usefulness of the book is by no means limited to formal teaching in the New York area: hundreds of individuals are teaching themselves by means of it; and it is used as far north as Maine and Ontario, as far west as Minnesota, and as far south as Virginia. The new title has therefore been considered more truly expressive of the scope of the contents, even though the book has not been extensively revised or enlarged.

BROOKLYN, NEW YORK  
May, 1949.



## SUMMER AND WINTER CHARACTERS

The chief feature by which woody plants may be recognized in the summer is the leaves. One should not try to identify a plant by detached leaves, however, as the arrangement of the leaves is just as important as their form. Also of importance are the characters of the branchlets with their buds, and the bark of the older branches and of the trunk. Flowers and fruits are very helpful, too, and sometimes practically necessary; but their absence at certain times of the year and on young specimens makes them less desirable as key characters.

The most important winter character is the buds: their arrangement on the branchlet, the presence or absence of a true terminal bud, the angle they assume in relation to the branchlet, the arrangement and character of their scales, etc. The characters of the branchlets are also important, with their leaf scars and, in some cases, stipule scars. In addition, the bark of the trunk is helpful, as well as the fruits, and, in some cases, clusters of flower buds for the next season.

The features of a winter twig are less familiar to most people than those of a leafy stem. For this reason a brief description of a typical winter twig, such as that of the largetooth aspen, is given here. At the tip of the stem is a large bud, the *terminal bud*, *A*, Fig. 1. Along the sides of the stem are other buds, *lateral buds*, cf. *B*, usually smaller, each one situated above a *leaf scar*, *C*. A leaf scar is left where a leaf of the previous summer fell from the stem. The location of buds above the leaf scars shows that these buds were formed in the axils of the leaves; and they are, therefore, called *axillary buds*. (In some plants there are several buds above a leaf scar; in these cases the middle or the lowest one of these buds is axillary, and the others are termed *accessory buds*. Some plants do not have a true terminal bud; but in these cases the uppermost axillary bud looks like a terminal bud and takes its place.) The leaf scar is marked with several small dots; these are the *vascular bundle scars*, cf. *D*, marking the place where the conducting strands extended from the stem into the leaf. On this stem there is a pair of small scars, one on each side of the leaf scar; these are *stipule scars*, cf. *E*, showing where these appendages were

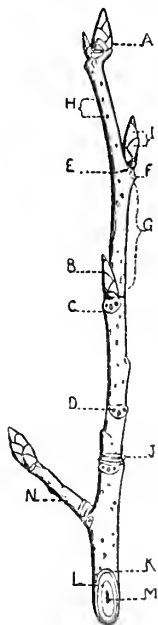


FIG. 1. Twig of largetooth aspen. For explanation of lettering see text.

attached. (Many plants do not have stipules.) The place on the stem where a leaf is borne (in some plants several leaves) is called a *node*, *F*; and the part of the stem between two adjacent nodes is the *internode*, *G*. Scattered over the surface of the stem are small dot-like markings, slightly raised. These are the *lenticels*, *H*, regions of loosely fitting cells, with air spaces among them, in the otherwise impervious corky covering of the stem.

A bud is an undeveloped shoot; it consists of a little stem, bearing tiny leaves, or flowers, or both; in woody plants of this climate it usually has its lowest leaves modified into scales, *bud scales*, *I*, which cover and protect the rest of the bud. The young stem and leaves within the bud lie dormant during the winter. In the spring the stem begins to lengthen and the leaves to expand, and the scales drop off. By this development of the terminal bud, the stem that bears it grows in length. The internodes between the expanding foliage leaves usually lengthen considerably, but those between the bud scales lengthen very little or not at all. Hence, when the bud scales fall, they leave a series of scars very close together; the scars themselves are very narrow, and they look like a succession of rings around the stem. A group of such *bud scale scars*, *J*, marks the beginning of each year's growth in length; these are visible on the stem for a number of years, until they are obliterated by its growth in thickness. The age of a twig can be determined by counting the groups of bud scale scars back from the tip. Some of the axillary buds may develop similarly, forming side branchlets, *cf. N*.

Some plants have *buds of definite growth*, in which all the leaves that are to develop on a given branchlet in one season are laid down in the bud the previous summer. When these leaves have expanded, the stem stops growing in length, and usually forms a terminal bud, unless the branchlet ends in a flower or flower cluster; a bud is also formed in the axil of each of the leaves. Other plants have *buds of indefinite growth*, in which there are a few fully formed leaves, and many others just beginning. When such a bud unfolds, the fully formed leaves expand and some of the partly formed leaves finish their development, and buds are formed in their axils. The stem continues to grow in length and to put out new leaves until cold weather stops it in the fall; it forms no terminal bud, and its growth in length the next year is taken up usually by the uppermost well formed axillary bud.

The stem is divided roughly into three concentric regions: *bark*, *K*, *wood*, *L*, and *pith*, *M*. The age of any part of the stem may be determined by counting the annual rings in the wood, which are clearly visible in cross section. The age thus determined would, of course, agree with the age computed by counting groups of bud scale scars.

The phyllotaxy, or arrangement of leaves on the stem (and consequently the arrangement of axillary buds), is in a general way constant for each species, although there may be some variation on different parts of the same plant, and occasionally some distortion due to twisting of the stem during growth. The leaves may be arranged in whorls (circles) of three or more at a node; or they may be opposite (two at a node), in which case adjacent pairs alternate with each other at right angles, making four vertical ranks of leaves; or they may be spirally arranged (alternate). Spirally arranged leaves may be in two, three, five, or eight ranks, or rarely more, but there is always just one leaf at a node.

## SUGGESTIONS ON THE USE OF THE KEYS

*Poison ivy and poison sumac* should be thoroughly familiar before any attempt is made to identify strange plants; descriptions and illustrations of these plants are to be found on page 55. The summer key here is so arranged that both poison ivy and poison sumac can be identified without being touched.

A *hand lens* is necessary to identify plants by these keys; for while many of the key characters are easily visible to the naked eye, some of them are not; and it is absolutely impossible to be sure of a correct determination of such questions as the presence or absence of a true terminal bud, of stipule scars, of appressed pubescence, etc., without the aid of a lens. A 10x lens is good for general use; but any power between 6x and 20x will answer the purpose.

*The whole plant* should be at hand when these keys are being used, whenever this is possible, particularly in the winter. When this is not possible, the plant should be studied carefully, and notes should be made on its stature, its bark, and any other characters that do not show in a small specimen. Since there is a considerable amount of variation among the branches of any individual plant, the specimen chosen should be one that is fairly representative of the plant as a whole. (The summer key is constructed in such a way that, in most cases, a plant can be identified from a small specimen; but this is not always possible.)

*The keys* themselves may now be considered. The summer key, for example, beginning on page 8, reads: "A. Lvs. needle-shaped, awl-shaped, scale-like, or linear"; and on page 9, "A. Lvs. comparatively broad and flat." We must first decide, then, according to the shape of the leaves, in which of these two "A" groups the plant belongs. We may then proceed, under the appropriate "A" group, to the "B" groups. Having decided, according to the arrangement of the leaves, in which of the two "B" groups the plant belongs, we go on to the "C" groups; and so on, by gradual stages, until we come to the name of a genus, or in some cases, of a species.

In most cases the keys require a decision between only two groups at each point; occasionally there are three or four, but in these cases the reader is directed, at the second group, to look farther. When distinctions become fine and somewhat difficult to determine, several characters are often given together, especially when some of these are temporary or obscure or variable. In such cases we should try to test each of the

characters named; but where, for example, the fruit is lacking, or the specimen is too young to show typical bark, we must use those features which are present.

The tentative identification thus determined should be checked by reading the description of that genus in the section on "Distinguishing Characters" beginning on page 27. In this section the names are arranged by families; but anyone unfamiliar with the families may readily locate a name by using the index.

The genus determined, we must find the species by reading the species descriptions to see which one fits the specimen. This is usually not difficult, as this handbook gives less than ten species for each of the genera except *Quercus* and *Salix*. We may further check the identification of the species by some of the reference books mentioned on pages 71 to 73, in which there may be illustrations and more detailed descriptions.

A considerable amount of judgment is necessary, in some cases, to determine characters from descriptions, and this judgment comes with experience. One should not be discouraged, therefore, if he does not always identify his plants correctly on first trial. In case of any possible doubt as to the meaning of terms, the glossary should be consulted, and this may be supplemented by a study of the same terms as defined and illustrated in Gray's *Lessons in Botany*, mentioned on page 71.

If the description of the genus arrived at in the key does not fit the plant, it is either because the plant is not within the scope of this handbook, or because the student has made a mistake. He should go back to the beginning of the key, and try to discover where he might have gone astray. In every case at least a tentative decision between two groups must be made; but the possibility of a mistake in judgment must always be kept in mind; and in case of doubt, both groups must be tried.

Plants which are variable have been included in more than one group in the keys. For example, certain plants, such as *Alnus* and *Hamamelis*, which are sometimes shrubs and sometimes tree-like, are included both under shrubs and under trees in the winter key. And certain plants, such as *Kalmia angustifolia*, whose leaves are sometimes opposite and sometimes in whorls, are put in both of these groups in the summer and evergreen key.

In anticipation of some of the difficulties in using the keys, the following suggestions are given:

1. To determine the presence or absence of a true terminal bud one must examine the tip of the branchlet carefully with the lens. *Generally speaking*, if the topmost bud is situated just above a leaf scar, it is axillary, and a true terminal bud is lacking. In this case, however, there must be something to represent the true stem tip (at another side of the bud, away

from the leaf scar): either a small stub, or another scar—*different from the leaf scars*—where the dead end of the stem fell off. Ordinarily, above each leaf scar there is a bud, large or small. But where several leaves were close together near the tip of the stem, there may be two or more leaf scars (near the terminal bud) without buds above them (in *Prunus serotina*, for example). One must be careful, in such a case, not to mistake the terminal bud for an axillary bud belonging to one of these leaf scars, and mistake another leaf scar for the stem scar. The *similarity* of the two leaf scars should prevent such a mistake.

2. A young tree may look like a shrub; and therefore what appears to be a shrub may have to be sought under “trees” in the winter key.

3. A climber is not always easy to distinguish in the very young stage if it lacks tendrils and has not yet started to climb; but the branchlets are usually long and very slender, and early show a tendency to coil as though reaching out for something to climb on.

4. Whether the leaves are opposite or whorled, or alternate is sometimes puzzling if the internodes are very short, as in *Kalmia latifolia* and in some of the conifers. In case of uncertainty, it should be assumed that the leaves are alternate, as pairs and whorls of leaves usually show fairly distinctly, especially if the stem is viewed from the tip rather than from the side. The leaves of any pair or whorl are usually of approximately the same size; hence if leaves appear to be at the same level but are markedly different in size, the probability is that the small one is actually younger and nearer the tip of the stem. A notable exception occurs in *Catalpa*, in which there are usually two large leaves and one small one at a node. Leaf scars on older parts of the twig often show their arrangement more clearly than the leaves of the current season.

5. A compound leaf can be distinguished from a branchlet with several simple leaves by the presence of a bud in its axil, and by the lack of buds in the axils of its leaflets; it may be terminated by a leaflet, but never by a bud. A branchlet has no bud in its axil, but has a bud in the axil of each of its leaves; it may be terminated by a bud, but never by a leaf. A deeply cut leaf is not considered compound unless it is divided into separate parts all the way to the rachis or midrib.

6. Plants classed as having “lvs. symmetrical at base” often have some unsymmetrical leaves; and even on plants characterized by having “lvs. very unsymmetrical at base,” some of the leaves are nearly symmetrical. One must look at *many leaves*, therefore, and try to judge the plant fairly by the majority.

7. The difference between shallow lobes in a leaf and large, coarse teeth may not always be clear, in such plants as *Ilex opaca* and *Quercus*

*bicolor*. One should be ready to change his opinion concerning such characters if he has trouble in naming his plant.

8. By midsummer the buds for the following season are well formed in the axils of the leaves and at the tips of the branchlets, and are typical in appearance. Early in the summer, however, when the buds are not fully developed, they may not look typical or may not be visible at all; at this time, therefore, one must look for dormant buds on twigs of the previous year.

9. Evergreens may be recognized in the summer by the presence on the plant of leaves of more than one season. Leaves of the current season are usually much lighter in color. The stem of the current year, too, can usually be recognized by a difference in color, and by the position (at its base) of the last group of bud scale scars. If leaves are still present on older parts of the stem, the plant is evergreen; but it must be remembered that very short branchlets of the current year (bearing new leaves) may occur along the sides of older parts of the stem; and the leaves on these may at first appear to be borne directly on the old wood. As a general rule, the leaves of evergreens are of firmer texture than those of deciduous plants; at least one can be sure that very thin-leaved plants are not evergreen.

*These keys must never be used* to build up a description of a genus by starting from its name in the key and working backwards. The purpose of the keys is to guide the student to the name of a plant strange to him. The characters used are such as to identify *those species of each genus which are included in this list*, and will not necessarily answer for species out of the range of Greater New York, or for species so uncommon in cultivation that they have not been included in this handbook. Furthermore, in many cases, a genus occurs in several places in the key, on account of differences among the species or great variability even within a species. For example, *Gleditsia triacanthos*, whose very name indicates thorniness, may be found under "stems without thorns," because there is a thornless variety; and such plants as *Broussonetia*, which are characteristically variable, having both alternate and opposite leaves and buds, may be found in the keys under either of these groups.

# KEY TO GENERA BASED ON SUMMER CHARACTERS

Numbers refer to pages.

- A. Lvs. needle-shaped, awl-shaped, scale-like, or linear.
- B. Lvs. in pairs or in three's around the stem, or (at least some of them) in clusters.
  - C. Lvs. in alternating pairs or in three's around the stem.
    - D. Lvs. in alternating pairs, at least some of them scale-like.
      - E. Scale-like lvs. forming 4-sided brts. (sometimes awl-shaped lvs. on same plant) ..... *Juniperus* 32
      - E. Lvs. all scale-like, forming flat or cord-like brts.
        - F. Lvs. usually whitish below, cones globular, cone scales thick.
          - Chamaecyparis* 31
        - F. Lvs. usually not whitish below, cones conical, cone scales thin ... *Thuja* 32
    - D. Lvs. in alternating pairs or in three's, at least some of them awl-shaped or linear.
      - E. Lvs. stiff and sharp, either in pairs (with scale-like lvs. forming 4-sided brts. on same plant) or in three's ..... *Juniperus* 32
      - E. Lvs. pointed but usually soft, all alike on one plant, in pairs.
        - Chamaecyparis pisifera* vars. 32
  - C. Lvs., at least some of them, in clusters of 2 or more.
    - D. Lvs. 2-5 in each cluster, sheathed at the base by dry scales ..... *Pinus* 28
    - D. Lvs. many in each whorl-like cluster.
      - E. Lvs. 3-5 in. long, in whorls around the stem, each lf. in the axil of a little scale ..... *Sciadapitys* 31
      - E. Lvs. less than 3 in. long, in whorls on short, thick spurs (lvs. also arranged spirally along long growths of stem).
        - F. Lvs. stiff, sharp, evergreen ..... *Cedrus* 29
        - F. Lvs. soft, blunt, deciduous.
          - G. Lvs. short,  $\frac{1}{2}$ - $\frac{3}{4}$  ( $1\frac{1}{4}$ ) in. long; cone scales persistent ..... *Larix* 29
          - G. Lvs. longer,  $\frac{3}{4}$ - $1\frac{1}{2}$  (3) in. long; cone scale deciduous .. *Pseudolarix* 29
  - B. Lvs., at least some of them, spirally arranged.
    - C. Lvs. needle- or awl-shaped.
      - D. Lvs. mounted on little stalks.
        - E. Lvs. 4-sided, all spirally arranged, set close together on brts. .... *Picea* 29
        - E. Lvs. 3-sided, sparsely scattered on long growths of stem, whorled on short spurs ..... *Cedrus* 29
      - D. Lvs. not on stalks.
        - E. Lvs. strongly decurrent on stem ..... *Cryptameria* 31
        - E. Lvs. not decurrent ..... *Taxodium ascendens* 31
    - C. Lvs. linear, flattened.
      - D. Lvs. abruptly narrowed into short stalks, all spirally arranged.
        - E. Lvs. sharp-pointed at end ..... *Taxus* 27
        - E. Lvs. not sharp-pointed at end ..... *Tsuga* 30
      - D. Lvs. not abruptly narrowed into distinct stalks.
        - E. Lvs. deciduous, soft.
          - F. Lvs. very short, up to  $\frac{1}{2}$  in., apparently 2-ranked on most of the brts., making these resemble compound leaves ..... *Taxodium distichum* 31



- F. Lvs. longer,  $\frac{1}{2}$ – $1\frac{1}{2}$  (3) in., spirally arranged on long growths of stem, in whorls on short spurs.
- G. Lvs. short,  $\frac{1}{2}$ – $\frac{3}{4}$  ( $1\frac{1}{4}$ ) in.; cone scales persistent ..... *Larix* 29
- G. Lvs. longer,  $\frac{3}{4}$ – $1\frac{1}{2}$  (3) in.; cone scales deciduous ..... *Pseudolarix* 29
- E. Lvs. evergreen, firm, all spirally arranged, leaving circular leaf scars.
- F. Leaf scars flat against the twig ..... *Abies* 30
- F. Leaf scars raised from the twig at lower edge ..... *Pseudotsuga* 31
- A. Lvs. comparatively broad and flat.
- B. Lvs. more than one at a node (opposite or whorled) (2d B, p. 11).
- Note: The barberry, a spiny shrub, might be sought here by the student, as the lvs. appear to be opposite or whorled on the short spurs in the axils of the spines. The spines themselves are modified leaves, however, and are clearly alternate; hence this genus is put in the alternate-leaved group.
- C. Lvs., at least in some cases, in whorls of 3 or 4 at a node, sometimes opposite.
- D. Lvs. evergreen, small,  $\frac{3}{4}$ – $2\frac{1}{2}$  in. long, 2, 3, or 4 at a node; shrubs. *Kalmia angustifolia* 61
- D. Lvs. deciduous, larger,  $2\frac{1}{2}$ –12 in. long, 2 or 3 at a node; shrubs or trees.
- E. Lvs. large, 4–12 in. long, mostly 3 at a node, without stipules; trees. *Catalpa* 64
- E. Lvs. smaller,  $2\frac{1}{2}$ –6 in. long, 2 or 3 at a node, with triangular stipules; shrub or small tree ..... *Cephalanthus* 65
- C. Lvs. 2 at a node (opposite).
- D. Lvs., at least some of them, compound.
- E. Climbing; with aerial rootlets ..... *Tecoma* 64
- E. Not climbing; without aerial rootlets.
- F. Brs. hollow, lvs. often simple ..... *Forsythia* 63
- F. Brs. with solid pith, lvs. all compound.
- G. Lvs. palmately compound ..... *Aesculus* 58
- G. Lvs. pinnately compound.
- H. Lfts. 3, finely serrate; shrub ..... *Staphylea* 56
- H. Not as above.
- I. Buds completely hidden under bases of petioles; lfts. 5–13; trees. *Phellodendron* 54
- I. Buds not hidden under petioles; lfts. 3–11; trees or shrubs.
- J. Brts. slender and flexible; lfts. 3–7 (rarely 9).
- K. Lfts. 3–5 (rarely 7–9) with few, large, irregular teeth; tree. *Acer Negundo* 57
- K. Lfts. 5–7, regularly serrate with many teeth; shrubs. *Sambucus* 66
- J. Brts. stout and stiff; lfts. 5–11, entire or toothed; trees. *Fraxinus* 63
- D. Lvs. simple.
- E. Lvs., all or some of them, lobed.
- F. Brs. hollow or with chambered pith, lvs. often not lobed.
- G. Twining; half-evergreen; lvs. small, 1–3 in., brts. pubescent. *Lonicera* 65
- G. Not twining; deciduous; brts. smooth, or lvs. much larger.
- H. Lvs. large, 5–10 in. long, shallowly 3–5-lobed or undivided, not toothed; trees ..... *Paulownia* 64
- H. Lvs. smaller,  $2\frac{1}{2}$ – $5\frac{1}{2}$  in. long, deeply 2- or 3-parted or undivided, serrate or occasionally entire; shrubs ..... *Forsythia* 63

- F. Brs. with solid pith.
- G. Lvs. irregularly lobed or undivided, sometimes alternate, very rough above ..... *Broussonetia* 45
  - G. Lvs. palmately 3-11-lobed, all opposite, not rough above.
    - H. Lvs. 3-lobed, with tiny black dots below, and with stipules; shrub. *Viburnum acerifolium* 65
    - H. Lvs. 3-11-lobed, without black dots or stipules; trees ..... *Acer* 57
- E. Lvs., at least some of them, not lobed.
- F. Sap milky; lvs. often lobed, sometimes alternate ..... *Broussonetia* 45
  - F. Sap not milky.
    - G. Lvs. very large, 4-12 in. long; trees.
      - H. Lvs. pubescent on both sides, regularly opposite, sometimes shallowly 3-5-lobed ..... *Paulownia* 64
      - H. Lvs. glabrous or nearly so above, more often in 3's, not lobed. *Catalpa* 64
    - G. Lvs. smaller, not more than 6 in. long; shrubs or trees.
      - H. Lvs. entire.
        - I. Twining ..... *Lonicera* 65
        - I. Not twining.
          - J. Triangular stipules present, lvs. sometimes in three's. *Cephalanthus* 65
          - J. Stipules lacking.
            - K. Lvs. evergreen.
              - L. Lvs. sometimes in three's or four's; flower clusters axillary; low, rarely more than 3 ft. *Kalmia angustifolia* 61
              - L. Lvs. regularly opposite; flower clusters terminal (often kept trimmed and not allowed to bloom); taller unless trimmed ..... *Ligustrum* 63
            - K. Lvs. deciduous.
              - L. Brs. hollow or with chambered pith; lvs. often serrate, at least above the middle (sometimes 3-parted or with 3 lfts.). *Forsythia* 63
              - L. Brs. with solid pith; lvs. regularly undivided and entire.
                - M. Lvs. small,  $\frac{3}{4}$ -1 $\frac{1}{2}$  (2 $\frac{1}{2}$ ) in. long, mostly elliptic. *Ligustrum* 63
                - M. Lvs. larger, 1 $\frac{1}{2}$  to 4 or 6 in. long.
                  - N. Lvs. smooth, broadly ovate ..... *Syringa* 63
                  - N. Lvs. usually pubescent at least on veins below; or if smooth, then narrow, elliptic or lanceolate ..... *Cornus* 59

H. Lvs. toothed.

    - I. Lvs. oblanceolate, often alternate; buds with a single cap-like scale ..... *Salix purpurea* 34
    - I. Not as above.
      - J. Lvs. somewhat fleshy, the upper ones alternate; plants of salt marshes ..... *Iva* 66
      - J. Not as above.
        - K. Lvs. finely toothed and finely ciliate ..... *Diervilla* 65
        - K. Not as above.

- L. Lvs. with rounded, shallow teeth ..... *Evonymus* 56
- L. Lvs. with pointed teeth, or occasionally entire.
  - M. Brs. hollow or with chambered pith; lvs. sometimes 3-parted or with 3 lfts., occasionally entire ..... *Forsythia* 63
  - M. Brs. with solid pith ..... *Viburnum* 65
- B. Lvs. only one at each node (alternate).
- C. Lvs. compound.
- D. Stems without spines or prickles.
- E. Lvs., at least some of them, with 3 lfts.
  - F. Lfts. entire or wavy-toothed or with few, large, irregular teeth.
    - G. Lfts. approximately equal; at least the terminal one distinctly slender-stalked; poisonous to touch ..... *Rhus Toxicodendron* 55
    - G. Lfts. not definitely stalked; the terminal one often much larger.
      - H. Lvs. all similar and with pellucid dots; shrub or tree ..... *Ptelea* 54
      - H. Lvs. without pellucid dots, some of them often undivided or only lobed; plant climbing or trailing ..... *Solanum* 64
  - F. Lfts. sharply serrate except at base, sometimes more than 3.
    - G. Lfts. smooth or nearly so, 3 to 7 in number.
      - H. Tree with stout, stiff brts.; lfts. 3-7, usually 5 ..... *Carya glabra* 36
      - H. Low shrub, almost herbaceous; lfts. 3 or 5 ..... *Rubus triflorus* 50
    - G. Lfts. tomentose below, sometimes up to 9 in number, or lvs. only lobed.
      - Sorbus hybrida* 49
- E. Lvs. with more than 3 lfts.
  - F. Stems with tendrils; lvs. palmately compound of 5 lfts. .. *Parthenocissus* 58
  - F. Stems without tendrils; lvs. pinnately compound.
    - G. Lvs. once pinnate.
      - H. Lfts. entire or nearly so.
        - I. Rachis winged ..... *Rhus copallina* 55
        - I. Rachis not winged.
          - J. Lfts. with a few large, gland-bearing teeth at base .. *Ailanthus* 54
          - J. Not as above.
            - K. Shrub or small tree of swamps; twigs smooth, light gray, marked with dark lenticels; very poisonous to touch.
              - Rhus Vernix* 55
            - K. Not as above.
              - L. Lfts. marked with little dots; shrub ..... *Amorpha* 53
              - L. Not as above.
                - M. Lfts. oblong-lanceolate, faintly wavy-toothed; lvs. sometimes twice pinnate ..... *Gleditsia* 52
                - M. Not as above.
                  - N. Twiners ..... *Wisteria* 53
                  - N. Trees.
                    - O. Lfts. 7-9, alternate, large, up to 4 in. long.
                      - Cladrastis* 53
                    - O. Lfts. 7-25, opposite, smaller, not over 2 in. long.
                      - P. Lfts. blunt and mucronate or brts. glandular-viscid; brs. often with stipular spines ..... *Robinia* 54
                      - P. Lfts. acute, glaucous and appressed-pubescent below; brs. without stipular spines ..... *Sophora* 53

- H. Lfts. distinctly toothed.
  - I. Sap milky ..... *Rhus typhina* and *R. glabra* 55
  - I. Sap not milky.
    - J. Teeth long-spiny; shrub ..... *Mahonia* 46
    - J. Teeth not spiny; trees.
      - K. Pith chambered ..... *Juglans* 35
      - K. Pith not chambered.
        - L. Lfts. 5-11, large, 3-7 in. long ..... *Carya* 36
        - L. Lfts. usually 9-17, smaller,  $\frac{3}{4}$ -4 in. long (lvs. sometimes compound only at base, the upper part or even the whole only lobed) ..... *Sorbus* 49
- G. Lvs. twice pinnate.
  - H. Lfts. ovate or elliptical, entire ..... *Gymnocladus* 52
  - H. Lfts. oblong-lanceolate, with a slightly wavy-toothed margin; lvs. sometimes only once pinnate ..... *Gleditsia* 52
- D. Stems with spines or prickles.
  - E. Stems with comparatively few stout spines; lvs. not prickly; trees.
    - F. Spines in pairs at bases of lvs. .... *Robinia* 54
    - F. Spines solitary, above attachment of lvs., often branched ..... *Gleditsia* 52
  - E. Stems with many prickles; lvs. often prickly; shrubs.
    - F. Lvs. pinnately compound of 5-9 lfts., not white-downy below ..... *Rosa* 51
    - F. Lvs. of 3-5 lfts., pinnately or palmately compound, sometimes white-downy below ..... *Rubus* 50
- C. Lvs. simple.
  - D. Lvs., at least some of them, lobed.
    - E. Lvs. parallel veined, fan-shaped, 2- (or more-) lobed, sometimes undivided.
      - Ginkgo* 27
  - E. Not as above.
    - F. Lvs. palmately veined.
      - G. Sap milky; lvs. sometimes undivided.
        - H. Bark of medium sized brs. gray, with greenish inner streaks and conspicuous orange lenticels; lvs. sometimes opposite .. *Broussonetia* 45
        - H. Bark of medium sized brs. yellowish or brownish, without contrasting lenticels; lvs. all alternate ..... *Morus* 45
      - G. Sap not milky.
        - H. Stems with axillary thorns ..... *Crataegus* 50
        - H. Stems without axillary thorns.
          - I. Climbing.
            - J. With tendrils ..... *Vitis* 58
            - J. Without tendrils ..... *Menispermum* 46
          - I. Not climbing.
            - J. Shrub with glandular-hairy stems ..... *Rubus odoratus* 50
            - J. Trees with stems not glandular-hairy.
              - K. Lvs. star-shaped, finely serrate ..... *Liquidambar* 47
              - K. Lvs. not star-shaped; lobes coarsely toothed or entire.
                - L. Twigs and petioles aromatic when broken; lvs. sometimes not lobed ..... *Sassafras* 46
                - L. Not aromatic.
                  - M. Lvs. white-tomentose below even when mature, sometimes not lobed; bark of twigs very bitter .. *Populus alba* 34

- M. Lvs. nearly smooth when mature; bark of twigs not bitter ..... *Platanus* 47
- F. Lvs. pinnately veined.
- G. Twining; lvs. sometimes undivided ..... *Solanum* 64
- G. Not twining.
- H. Stems with axillary thorns ..... *Crataegus* 50
- H. Stems without axillary thorns.
- I. Lvs. 4-6-lobed, squarish at apex; a stipule scar encircling brt. above each petiole ..... *Liriodendron* 45
- I. Lvs. 2-many-lobed, pointed or rounded at apex.
- J. Lvs. aromatic.
- K. Lvs. narrow, regularly pinnately lobed .. *Myrica asplenifolia* 35
- K. Lvs. broad, irregularly palmately lobed or undivided. .... *Sassafras* 46
- J. Lvs. not aromatic.
- K. Lvs. and brts. with many, small, dark resin glands. .... *Betula pendula* var. *gracilis* 39
- K. Lvs. and brts. without resin glands.
- L. Pith angled or lobed; lvs. occasionally undivided .. *Quercus* 40
- L. Pith round.
- M. Lf. lobes entire, sharp; buds long, slender, sharp-pointed. .... *Fagus sylvatica* var. *incisa* 40
- M. Lf. lobes toothed; buds shorter and broader or blunt.
- N. Lvs. very unsymmetrical at base, lobed only at the broad apex or not at all ..... *Ulmus glabra* 44
- N. Lvs. symmetrical at base, sometimes with 1-4 pairs of lflets. at base ..... *Sorbus hybrida* 49
- D. Lvs., at least some of them, not distinctly lobed.
- E. Lvs. parallel veined (fan-shaped, sometimes lobed) ..... *Ginkgo* 27
- E. Lvs. not parallel veined.
- F. Lvs. palmately veined.
- G. Climbing.
- H. With tendrils.
- I. Entirely glabrous; stems usually prickly ..... *Smilax* 33
- I. More or less pubescent or woolly; not prickly (lvs. sometimes lobed) ..... *Vitis* 58
- H. Without tendrils (lvs. sometimes lobed) ..... *Menispermum* 46
- G. Not climbing.
- H. Sap milky; lvs. often irregularly lobed.
- I. Lvs. often opposite; bark of medium sized brs. gray, with conspicuous orange lenticels ..... *Broussonetia* 45
- I. Lvs. all alternate; bark of medium sized brs. yellowish or brownish, with yellowish lenticels ..... *Morus* 45
- H. Sap not milky; lvs. not lobed.
- I. Lvs. somewhat fleshy, the lower ones opposite; shrub of salt marshes ..... *Iva* 66
- I. Not as above.
- J. Lvs. toothed.
- K. Lvs. with tufts of hairs in axils of veins below, or whole lower surface tomentose ..... *Tilia* 59

- K. Lvs. smooth or slightly hairy below.
  - L. Lvs. very unsymmetrical at base, long- and slender-pointed at tip, prominently toothed; tree ..... *Celtis* 44
  - L. Lvs. symmetrical at base, acute but not long-pointed at tip, very shallowly toothed; shrub ..... *Ceanothus* 58
- J. Lvs. entire, heart-shaped or nearly round ..... *Cercis* 53
- F. Lvs. pinnately veined.
- G. Evergreen.
  - H. Lvs. toothed, at least at tip.
    - I. Stems very slender; upright ones 2-6 in. tall ..... *Gaultheria* 62
    - I. Stout shrubs or trees several or many feet tall when mature... *Ilex* 56
  - H. Lvs. entire.
    - I. Lvs. small, less than  $\frac{3}{4}$  in. long; trailing shrub.
      - Vaccinium macrocarpon* 62
    - I. Lvs. larger, more than  $\frac{3}{4}$  in. long; upright shrubs.
      - J. Buds very inconspicuous, much flattened; capsules roundish.
        - Kalmia latifolia* 61
      - J. Buds easily visible, conical, with several overlapping scales; capsules ovate or oblong ..... *Rhododendron* 61
  - G. Deciduous.
    - H. Lvs. sprinkled with shiny, yellow resin dots.
      - I. Lvs. aromatic when crushed, obscurely toothed near tip .. *Myrica* 35
      - I. Lvs. not aromatic, entire ..... *Gaylussacia* 62
    - H. Lvs. not as above.
      - I. Stipule scar or scars nearly or quite encircling brt. above each petiole.
        - J. Stipule scar completely encircling brt. .... *Magnolia* 45
        - J. Stipule scars not quite meeting around brt. .... *Fagus* 39
      - I. Not as above.
        - J. Stems aromatic when broken.
          - K. Lvs. entire.
            - L. Lvs. obovate or elliptic, evenly distributed along brts.; often several buds in axil of a lf. .... *Benzoin* 46
            - L. Lvs. ovate or elliptic or irregularly lobed, very unevenly distributed along brts.; only one bud in axil of each lf.
              - Sassafras* 46
  - K. Lvs. toothed.
    - L. Petioles glandular ..... *Prunus serotina* 51
    - L. Petioles not glandular ..... *Betula lenta* and *B. lutea* 38
- J. Stems not aromatic when broken.
  - K. Sap milky; stems sometimes with spines; tree ..... *Machura* 44
  - K. Sap not milky.
    - L. Stems spiny.
      - M. Spines stout, in lf. axils ..... *Crataegus* 50
      - M. Spines smaller, replacing lvs. of main shoots, with short brts. in their axils ..... *Berberis* 46
    - L. Stems not spiny.
      - M. Twining.
        - N. Lvs. toothed ..... *Celastrus* 56
        - N. Lvs. entire, or pinnately or irregularly lobed at base, or even compound ..... *Solanum* 64

**M.** Not twining.**N.** Lvs. very unsymmetrical at base.**O.** Lvs. coarsely wavy-toothed .....*Hamamelis* 47**O.** Lvs. sharply serrate.**P.** Lvs. ovate, doubly serrate, often pubescent below but never white .....*Ulmus* 43**P.** Lvs. heart-shaped, simply serrate, or if doubly serrate, then white-tomentose below .....*Tilia* 59**N.** Lvs. symmetrical at base.**O.** Lvs. with elongated dark glands along upper side of midrib .....*Aronia* 49**O.** Not as above.**P.** Bark of twigs bitter.**Q.** Lvs. about as broad as long, or with few large teeth (8-15 on each side), or both .....*Populus* 34**Q.** Lvs. distinctly longer than broad, and with more and finer teeth or no teeth.**R.** Lvs. entire or nearly so.**S.** Lvs. not at all toothed, elliptic or ovate, glaucous and pubescent below (but not tomentose), without stipules; fr. fleshy; buds with several scales ....*Vaccinium stamineum* 62**S.** Lvs. usually at least sparingly toothed, lanceolate or elliptic, tomentose at least when young, sometimes glaucous, sometimes with stipules; fr. dry; buds with a single cap-like scale .....*Salix* 33**R.** Lvs. distinctly toothed.**S.** Buds with a single cap-like scale; lvs. either lanceolate or glaucous below or short-petioled ( $\frac{1}{2}$  in. or less); petioles usually not glandular, or if so, then lvs. both lanceolate and either silky below or glandular-serrate ..*Salix* 33**S.** Buds with more than 1 scale showing; other characters not combined as above.**T.** Lvs. with 2 or more glands on petiole or at base of blade .....*Prunus* 51**T.** Not as above .....*Malus* 48**P.** Bark of twigs not bitter.**Q.** Lvs. entire or nearly so.**R.** Lvs. *appressed*-pubescent over whole lower surface even when mature ..*Cornus alternifolia* 60**R.** Not as above.**S.** Margins of lvs. ciliate and midribs strigose; lvs. often all crowded together at tips of brts. (scattered on more vigorous shoots) and brts. clustered at end of previous year's growth .....*Rhododendron* 60**S.** Lvs. not both ciliate on margin and strigose on midrib; lvs. and brts. more scattered.

- T. Brts. very slender; lvs. small, mostly  $\frac{3}{4}$ - $2\frac{1}{2}$  (sometimes to 4) in. long; shrubs.
- U. Lf.-bud scales sharp-pointed; frs. fleshy, usually in short, dense clusters; lvs. sometimes ciliate ..... *Vaccinium* 62
- U. Bud scales blunt; frs. dry, usually in longer, terminal, branched clusters; lvs. sometimes obscurely toothed, not ciliate.  
*Lyonia* 61
- T. Brts. stouter; lvs. larger, mostly 2-4 (sometimes to  $5\frac{1}{2}$ ) in. long; trees.
- U. Pith angled or lobed in cross section, continuous; lvs. occasionally lobed.  
*Quercus Phellos* and *Q. heterophylla* 43
- U. Pith round, often with stuffed chambers.
- V. Lvs. obovate or elliptic, usually acute at both ends; lf. scars with three distinct bundle scars; frs. small, dark.  
*Nyssa* 60
- V. Lvs. ovate or elliptic, more often rounded at base; lf. scars with many bundle scars crowded into a continuous line; frs. large, about 1 in. in diam., yellowish ..... *Diospyros* 63
- Q. Lvs. distinctly toothed or notched.
- R. Buds stalked; cone-like woody pistillate catkins present on mature plants all summer. *Alnus* 39
- R. Buds sessile; woody pistillate catkins lacking.
- S. Brts. marked with lengthwise lines starting from nodes (lines sometimes obscured by dense tomentum).
- T. Lvs. coarsely toothed.
- U. Lvs. large, 5-10 in. long, with slender-pointed teeth; stems usually growing from stumps of dead trees ..... *Castanea* 40
- U. Lvs. smaller,  $\frac{3}{4}$ -3 in. long, with blunt-pointed teeth; shrub of salt marshes.  
*Baccharis* 66
- T. Lvs. finely toothed.
- U. Tiny, dark stipules or their scars present; frs. fleshy; lvs. usually pubescent, at least on veins below ... *Ilex verticillata* 56
- U. Stipules lacking; frs. dry; lvs. densely tomentose or entirely glabrous below.  
*Spiraea* 48
- S. Brts. not marked with lengthwise lines.
- T. Lvs. doubly and sharply serrate.
- U. Bark marked with transversely elongated lenticels, even on brs. only 5 or 6 years old.
- V. Buds pointed; trees ..... *Betula* 38



- V. Buds blunt; shrub .....*Corylus* 37
- U. Bark not as above.
  - V. Brts. dull, slightly hairy; shrub.
    - Corylus* 37
  - V. Brts. shining, usually smooth; trees.
    - W. Lvs. smooth except for a few hairs on veins below and tufts of hairs in axils of veins; bark smooth; buds reddish .....*Carpinus* 37
    - W. Lvs. slightly hairy on both sides; bark scaly; buds greenish ...*Ostrya* 37
- T. Lvs. simply toothed, sharply or bluntly.
  - U. Lvs. obovate, entire toward base.
    - Clethra* 60
- U. Not as above.
  - V. Buds long, slender, pointed; lvs. folded lengthwise when young; bark smooth .....*Amelanchier* 49
  - V. Buds short.
    - W. Lvs. with fine teeth ending in little hairs which are sometimes gland-tipped .....*Vaccinium* 62
    - W. Not as above.
      - X. Lvs. very short-petioled; frs. dry; shrub .....*Leucothoë* 61
      - X. Lvs. on longer petioles ( $\frac{1}{2}$  in. or more); frs. fleshy; tree ..*Pyrus* 49

# KEY TO GENERA BASED ON WINTER CHARACTERS

(FOR EVERGREENS SEE SUMMER KEY)

Numbers refer to pages

- A. Buds opposite.
- B. Woody climbers (vines).
  - C. Purely stem twiners; lf. scars crescent-shaped, raised (in *L. japonica*, base of petiole often persistent); usually several pairs of bud scales exposed; lvs. often half-evergreen ..... *Lonicera* 65
  - C. Climbing mainly by aerial rootlets arising at nodes; lf. scars elliptical or shield-shaped, low; 2 bud scales exposed; lvs. deciduous ..... *Tecoma* 64
- B. Shrubs (see 3d B).
  - C. Terminal bud absent.
    - D. Stipule scars present.
      - E. Buds small (often in whorls of 3), sunken; globular heads of fr. persistent in winter; swamps and ponds ..... *Cephalanthus* 65
      - E. Buds larger, about  $\frac{1}{4}$  in. long, ovoid, with 4 blunt scales exposed; older stems white-striped; bladdery fr. persistent; rocky woods ..... *Staphylea* 56
    - D. Stipule scars absent (lf. scars meeting laterally or connected by transverse lines or flaps in some cases).
      - E. Brts. with distinctly wide pith and prominent lenticels ..... *Sambucus* 66
      - E. Brts. not as above.
        - F. Buds very small; brts. with numerous (more than 4) prominent vertical lines; shrub of salt marshes ..... *Iva* 66
        - F. Not as above; usually cult.
          - G. Lf. scars nearly meeting around brt. .... *Acer* 57
          - G. Lf. scars wide apart laterally ..... *Syringa* 63
    - C. Terminal bud present.
      - D. Brts. with 1 pair of vertical lines, which descend from the middle points between the lf. scars ..... *Diervilla* 65
      - D. Brts. with 2 pairs of vertical lines, each pair descending from sides of lf. scars (in some species of *Evonymus* parallel corky ridges or "wings" also present) (see 3d and 4th D's).
        - E. Brts. yellow ..... *Forsythia* 63
        - E. Brts. green or purplish ..... *Evonymus* 56
        - E. Brts. brown ..... *Syringa* 63
      - D. Brts. with more than 2 pairs of vertical lines; shrub of salt marshes ... *Iva* 66
      - D. Brts. without vertical lines.
        - E. Lvs. half-evergreen ..... *Ligustrum* 63
        - E. Lvs. early deciduous.
          - F. Lvs. entire; lf. scars joined transversely by a more or less distinct ridge or flap (usually notched or depressed between the lf. scars); buds with mainly 2 scales exposed (4 in fl. buds of *C. florida*) which are valvate or nearly so ..... *Cornus* 59
          - F. Lvs. toothed; lf. scars not quite meeting at sides (sometimes joined by a transverse ridge); buds covered by 2 valvate or 2 or 3 pairs of scales. *Viburnum* 65

- B. Trees.**
- C. Terminal bud absent.**
- D. Sap milky** ..... *Broussonetia* 45
- D. Sap not milky.**
- E. Lf. scar shield-shaped or nearly circular; buds small, superposed, the upper sunken; capsules and fl. buds persistent in winter** ..... *Paulownia* 64
- E. Lf. scar horseshoe-shaped, almost surrounding bud; bud silky, with prominent keel** ..... *Phellodendron* 54
- E. Lf. scars linear, nearly meeting around brt.** ..... *Acer* 57
- C. Terminal bud present.**
- D. Brts. with 2 pairs of vertical lines (sometimes developed into wings) descending from sides of lf. scars** ..... *Evonymus* 56
- D. Brts. without such lines.**
- E. Terminal bud  $\frac{1}{2}$ -1 in. or more in length; sessile, blunt, ovoid** ... *Aesculus* 58
- E. Terminal bud less than  $\frac{1}{2}$  in. in length; or sharp-pointed and stalked.**
- F. Shrubs or small trees.**
- G. Lvs. entire; lf. scars joined transversely by a more or less distinct ridge or flap (usually notched or depressed between the lf. scars); lf. buds with mainly 2 scales exposed (4 in fl. buds of *C. florida*) which are valvate or nearly so** ..... *Cornus* 59
- G. Lvs. toothed; lf. scars not quite meeting at sides (sometimes joined by a transverse ridge); buds covered by 2 valvate or 2 or 3 pairs of scales** ..... *Viburnum* 65
- F. Large trees.**
- G. Lf. scars triangular or u-shaped or horseshoe-shaped; bundle scars in 3 groups, one at the base and one at each side of the lf. scar.**
- H. Bud sessile, brown-silky, almost surrounded by lf. scar.**
- ..... *Phellodendron* 54
- H. Not as above** ..... *Acer* 57
- G. Lf. scars crescent-shaped to almost circular; bundle scars more numerous, in a crescent- or c-shaped aggregate** ..... *Fraxinus* 63
- A. Buds in whorls of 3 (see 3d A).**
- B. Tree; one small lf. scar and two large lf. scars at each node; long, cylindrical pods; cult. or escaped in Greater N. Y.** ..... *Catalpa* 64
- B. Shrub; lf. scars not as above; fr. heads globular; wet places** ..... *Cephalanthus* 65
- A. Buds, i.e. axillary buds, alternate.**
- B. Woody climbers (vines).**
- C. Prickles present on stem** ..... *Smilax* 33
- C. Prickles absent.**
- D. Climbing mainly by aerial rootlets (whole plant poisonous to touch); tendrils absent** ..... *Rhus Toxicodendron* 55
- D. Climbing mainly by tendrils formed at the nodes, although the slender stems often assist in the climbing process (aerial rootlets also rarely present on old stems of *Parthenocissus*) (see 3d D).**
- E. Pith brown; stems striate; tendrils unbranched, without expanded adhesive disks at their tips** ..... *Vitis* 58
- E. Pith white or greenish; stems terete; tendrils branched, the tips of the branches expanded into adhesive disks** ..... *Parthenocissus* 58
- D. Stem twiners; aerial rootlets and tendrils absent.**
- E. Lf. scars low, buds projecting outwards at right angles to axis of brt.**
- ..... *Celastrus* 56

- E. Lf. scars raised, buds not as above.
- F. Lf. scars with horn-like protuberances (at least on long shoots) . *Wisteria* 53
- F. All lf. scars without horn-like protuberances.
  - G. Lf. scars semicircular, flat; brts. more or less downy, terete or sometimes irregularly 3-sided; buds small, hairy, scales blunt ..... *Solanum* 64
  - G. Lf. scars circular or sometimes cleft at the top, concave; brts. not downy, fluted; buds minute ..... *Menispermum* 46
- B. Trees or shrubs.
  - C. Sap milky.
    - D. Thorns present, axillary; usually a small bud at their base ..... *Maclura* 44
    - D. Thorns absent.
      - E. Lf. scars nearly encircling the buds ..... *Rhus typhina* and *R. glabra* 55
      - E. Lf. scars rounded or semicircular, entirely below the buds.
        - F. Buds nearly covered (except at tip) by one or two striate scales (buds often opposite) ..... *Broussonetia* 45
        - F. Buds with several scales exposed ..... *Morus* 45
    - C. Sap not milky.
      - D. Brts. sticky (glandular) ..... *Robinia viscosa* 54
      - D. Brts. not sticky.
        - E. Brts. with bristles, prickles, or spines.
          - F. Shrubs.
            - G. Brts. bristly or with weak, irregularly distributed prickles.
              - H. Petiole base persistent ..... Raspberry group of the genus *Rubus* 50
              - H. Petiole base deciduous; buds sub-petiolar ..... *Robinia hispida* 54
            - G. Brts. armed with stiff spines or prickles.
              - H. Prickles irregularly distributed.
                - I. Petiole base persistent ..... Blackberry group of genus *Rubus* 50
                - I. Petiole base deciduous; lf. scars low, narrow ..... *Rosa* 51
              - H. Spines or prickles regularly distributed.
                - I. A single spine at each node.
                  - J. Spine (simple or branched) a modified lf., subtending bud at each node ..... *Berberis* 46
                  - J. Spine simple, axillary, a modified brt., usually with a bud alongside the base ..... *Crataegus* 50
                - I. Two prickles, usually somewhat recurved, below each node .. *Rosa* 51
      - F. Trees.
        - G. Spines branched ..... *Gleditsia* 52
        - G. Spines simple.
          - H. In pairs at lf. scars ..... *Robinia Pseudoacacia* 54
          - H. Not in pairs.
            - I. Single in lf. axils, usually with a bud alongside the base. *Crataegus* 50
            - I. Terminating tips of short brts. .... *Pyrus* 49
    - E. Bristles, prickles, or spines absent.
      - F. True terminal bud present (2d F, p. 23).
        - G. Buds clustered toward tip of brt.; scales closely 5-ranked; pith star-shaped in cross section ..... *Quercus* 40
        - G. Buds not clustered toward tip of brt.; or, if apparently so, other characters not as above.
          - H. Shrubs.

- I. Staminate and pistillate catkins present and naked during the winter; buds stalked, covered by 2 or 3 valvate or nearly valvate scales; pith 3-sided ..... *Alnus* 39
- I. Fis. not in catkins.
- J. Buds stalked ..... *Hamamelis* 47
- J. Buds sessile or nearly so.
- K. Bud scales valvate or nearly so; brts. shining, green or reddish purple; small tree, rare in Greater N. Y.  
*Cornus alternifolia* 60
- K. Bud scales imbricated; brts. not as above.
- L. Base of petiole persistent, partly sheathing the bud .. *Rubus* 50
- L. Petiole entirely deciduous, leaving a well defined lf. scar.
- M. Buds clustered toward tip of stem so that brts. tend to grow out in a whorl-like manner each season; fl. buds much larger than lf. buds; pith round .... *Rhododendron* 60
- M. Buds not clustered as above, fl. buds not clearly differentiated from lf. buds.
- N. Buds very small; terminal bud about  $\frac{1}{16}$  in. long; lateral,  $\frac{1}{32}$  in., commonly with a very tiny extra bud at their bases; brts. dark purple or grayish purple, very slender ..... *Ilex verticillata* 56
- N. Buds, at least the terminal, larger.
- O. Buds smooth or nearly so, long, slender, sharp-pointed.
- P. Buds carmine, sometimes with greenish tints; scales usually with glandular or ragged edges; clusters of berry-like frs. or their stalks persistent in winter ..... *Aronia* 49
- P. Buds greenish, sometimes with pinkish tints; scales often hairy or ciliate on margins; berry-like frs. early deciduous ..... *Amelanchier* 49
- O. Buds not as above, i.e., either very hairy, or short and broad, or blunt.
- P. Lenticels conspicuous; twigs stout; fr.: clusters of grayish white drupes; very poisonous to touch.  
*Rhus Vernix* 55
- P. Lenticels inconspicuous; twigs slender; fr.: dry capsules; not poisonous to touch.
- Q. Lf. scar triangular; bundle scar longitudinal, projecting; no stipule scars ..... *Clethra* 60
- Q. Lf. scar half-elliptical; bundle scar transverse, not projecting; stipule scars present .. *Ceanothus* 58
- H. Trees.
- I. Buds small, not more than  $\frac{1}{24}$  in. in length.
- J. Buds minute, hidden under bark, or in groups of 2 or more at the tips of the very slender brts.; bark shedding from brs. of 3 yrs. and older; fr. a woody cone ..... *Taxodium* 31
- J. Buds larger, globose, those on the brs. of 2 or more years back located at the tip of short shoots; fr. an open, scaly cone.
- K. Cones persistent ..... *Larix* 29

- K. Cones (at least the cone scales) deciduous; short shoots longer than in the last ..... *Pseudolarix* 29
- I. Buds, at least the terminal, more than  $\frac{1}{24}$  in. in length.
  - J. Buds stalked, tomentose; the terminal one-sided, the lateral more or less so; fl. buds distinct, small and globular, usually in groups of 3 ..... *Hamamelis* 47
  - J. Buds sessile.
    - K. Pith chambered.
      - L. Chambers empty; buds tomentose, not covered by typical scales; stipule scars absent ..... *Juglans* 35
      - L. Chambers stuffed; stipule scars encircling brt.
        - M. Buds covered by a single scale ..... *Magnolia* 45
        - M. Buds covered by 2 valvate scales, smooth, flattened, and blunt like duck's bill ..... *Liriodendron* 45
        - M. Buds with at least 4 small scales exposed, ovoid, pointed; stipule scars absent ..... *Nyssa* 60
    - K. Pith not chambered.
      - L. Stipule scars present and distinct (cracks in bark descending from sides of lf. scar on long shoots of *Ginkgo* are too large for stipule scars).
        - M. Stipule scars encircling brt.; buds covered by a single scale, terminal bud often much larger, ovoid .... *Magnolia* 45
        - M. Stipule scars nearly meeting around brt.; buds covered by many scales, long (about 1 in.) and slender ( $\frac{1}{8}$  in.) *Fagus* 39
      - M. Stipule scars shorter.
        - N. 3 scales exposed; stipule scars unequal; buds yellow-brown, thick and blunt, about  $\frac{1}{8}$  in. long; pith star-shaped ..... *Castanea* 40
        - N. 5 or more scales exposed.
          - O. Pith angled; lowest bud scale directly over lf. scar. *Populus* 34
          - O. Pith round; lowest bud scale not as above. *Prunus* 51
    - L. Stipule scars absent or indistinct.
      - M. Brts. with a pronounced green color.
        - N. Light to dark green, with spicy taste, internodes very variable in length; buds green, dull ..... *Sassafras* 46
        - N. Olive- or yellow-green, often with corky ridges; buds the same color, shining, sharp-pointed .... *Liquidambar* 47
        - N. Dark red above, green beneath; buds brown or reddish, hairy, blunt ..... *Prunus Persica* 52
      - M. Brts. without a pronounced green color.
        - N. Bundle scars 2 (most clearly shown on short, spur-like shoots); buds short, stout, blunt, lateral ones pointing outward at a wide angle, developing into short, spur-like shoots ..... *Ginkgo* 27
        - N. Bundle scars more than 2.
          - O. Bud scales valvate or nearly so.
            - P. Lf. scars crescent- or u-shaped, buds purplish. *Cornus alternifolia* 60

- P. Lf. scars heart-shaped or lobed, buds sulphur-yellow ..... *Carya cordiformis* 36
- O. Bud scales imbricated.
- P. Brts. thick,  $\frac{1}{4}$  in. or slightly less in diameter; lf. scars heart-shaped or lobed.
- Q. Brts. glabrous, gray or light red-brown, speckled with dark dots (lenticels); very poisonous to touch; pendent clusters of ivory or whitish drupes persistent in winter; shrub or small tree of wet places ..... *Rhus Vernix* 55
- Q. Brts. more or less pubescent, dark gray or dark red-brown to almost black; fr. a nut with dehiscent husk; tall forest trees.  
*Carya alba* and *C. ovata* 36
- P. Brts. of medium thickness, about  $\frac{1}{8}$  in. in diameter (see 3d P).
- Q. Lf. scars heart-shaped or lobed, low.  
*Carya glabra* 36
- Q. Lf. scars not heart-shaped or lobed, more or less raised.
- R. Buds more or less pubescent, terminal bud much larger than lateral.
- S. Brts. pale woolly, at least toward apex, buds more or less woolly ..... *Malus* 48
- S. Brts. glabrous, buds pubescent with long, matted hairs ..... *Sorbus Aucuparia* 49
- R. Buds glabrous; terminal of about same size as lateral (except sometimes in *Pyrus*).
- S. Brts. without any distinct taste; short shoots often with thorn-like ending ..... *Pyrus* 49
- S. Brts. with bitter taste like that of cherry pits; short shoots without thorn-like ending.  
*Prunus* 51
- P. Brts. slender, about  $\frac{1}{16}$  in. in diameter, olive-green to reddish brown, often covered with a gray skin; terminal bud often much larger than lateral, slender, long-pointed, green or with mingled shades of green and red; lf. scars linear; small tree or shrub.  
*Amelanchier* 49
- F. True terminal bud absent.
- G. Shrubs.
- H. Buds without evident scales; hairy ..... *Rhus copallina* 55
- H. Buds covered by a single, hollow-conical or flattened scale .. *Salix* 33
- H. Buds with more than one scale exposed.
- I. Staminate catkins present.
- J. Catkins pendulous, gray; brts. without aromatic fragrance.  
*Corylus* 37
- J. Catkins more or less erect, brown; brts. with aromatic fragrance ..... *Myrica asplenifolia* and *M. Gale* 35
- I. Staminate catkins absent.

- J. At least the fl. buds with their uppermost scales sprinkled with resin globules or encased in a resinous coating.
- K. Resin globules plentiful on brts. as well as on buds; buds not brightly colored; brts. with aromatic fragrance.
- Myrica caroliniensis* 35
- K. Resin globules usually evident only on the uppermost scales of the fl. buds; bud scales crimson with dark brown margins; brts. without aromatic fragrance ..... *Gaylussacia* 62
- K. Resin forming a coating which completely covers the bud; plant of salt marshes ..... *Baccharis* 66
- J. All buds without resin.
- K. Fl. buds distinctly differentiated from lf. buds in shape, and with a definite position on brts.
- L. Fl. buds in pairs, one bud on each side of a lf. bud, globose, greenish, and stalked in the lowermost scales of the lf. bud; brts. spicy-aromatic ..... *Benzoin* 46
- L. Fl. buds in racemose clusters 1-2 in. in length, each bud stalked, dark red or purple, ovate, pointed ..... *Leucothoë* 61
- K. Fl. buds not distinctly differentiated from lf. buds in shape (although they may be of larger size), and without a definite position on brts.
- L. Fl. buds much larger than lf. buds; brts. with shades of bright green or red ..... *Vaccinium* 62
- L. Fl. buds not markedly larger than lf. buds; brts. without shades of bright green or red.
- M. Buds superposed, with 2 or 3 scales exposed, the lower bud small, much sunken in bark ..... *Amorpha* 53
- M. Buds solitary or sometimes (*Prunus* and *Spiraea*) collaterally multiplied.
- N. Brts. yellow or light brown.
- O. Brts. smooth, buds carmine ..... *Lyonia* 61
- O. Brts. pubescent or tomentose, buds not carmine.
- P. Brts. pubescent, with rusty brown lenticels; lf. scars u-shaped, concave; large shrub or small tree.
- Rhus copallina* 55
- P. Brts. covered with rusty wool, lenticels not noticeable; lf. scars raised, triangular; low shrub, 2-3 ft.
- Spiraea tomentosa* 48
- N. Brts. dark purple or almost black.
- O. Brts. velvety, buds slightly so, brts. with bitter taste; medium-sized shrub of sea coast .... *Prunus maritima* 52
- O. Buds and brts. smooth, brts. without bitter taste; low shrub of meadows ..... *Spiraea latifolia* 48
- G. Trees.
- H. Catkins (staminate) present.
- I. Bark in large plates, scaly, papery, or curly; dwarf shoots numerous along 2-year-old or older twigs, giving an appearance like lateral buds ..... *Betula* 38



- I. Bark shedding in long, narrow, irregular, thin strips; dwarf shoots absent ..... *Ostrya* 37
- H. Catkins absent.
- I. Buds more or less sunken in the bark.
- J. Buds surrounded at sides and below or entirely hidden (*Robinia*) by lf. scar, superposed, very close together; brts. slender or of medium size.
- K. Brts. dark green, fr. a legume ..... *Sophora* 53
- K. Brts. brown or reddish.
- L. Brts. conspicuously swollen at and just below lf. scars; fr. a legume ..... *Gleditsia triacanthos* var. *inermis* 53
- L. Brts. not conspicuously swollen at nodes.
- M. Fr. a circular samara ..... *Ptelea* 54
- M. Fr. a legume ..... *Robinia Pseudoacacia* var. *inermis* 54
- J. Buds not surrounded (or only the lowest) by lf. scar, superposed some distance apart; fr. a legume; brts. stout. *Gymnocladus* 52
- I. Buds not evidently sunken in bark.
- J. Buds very hairy; no typical scales evident.
- K. Brts. finely downy; buds round, close to brt. .. *Rhus copallina* 55
- K. Brts. smooth; buds conical, standing out from brt. *Cladrastis* 53
- J. At least the lf. buds not hairy, but glabrous or somewhat pubescent; typical scales present.
- K. Pith chambered, at least near nodes; chambers often stuffed.
- L. Buds (about  $\frac{1}{16}$  in. long) closely appressed to brt.; bark of trunk warty; stipule scars present; pith often chambered only near nodes ..... *Celtis* 44
- L. Buds pointing outward from brt.; bark of trunk deeply divided into small polygonal chunks; stipule scars absent; pith irregularly chambered, the chambers often stuffed. *Diospyros* 63
- K. Pith not chambered.
- L. Buds covered by a single scale.
- M. Scale rather symmetrically conical; stipule scars encircling brt. .... *Platanus* 47
- M. Scale more or less flattened against brt.; stipule scars shorter or lacking ..... *Salix* 33
- L. Buds with 2 scales exposed; pith circular in section (see 3d and 4th L's).
- M. Scales of about the same size (an inner pair often showing under the outer pair); brts. stout ( $\frac{1}{8}$ - $\frac{3}{4}$  in. thick); lf. scars large, heart-shaped or shield-shaped; pith yellowish ..... *Ailanthus* 54
- M. Scales unequal, outer scale shorter and giving bud lopsided appearance; brts. more slender ( $\frac{1}{8}$ - $\frac{1}{4}$  in. thick); lf. scars half-elliptical; pith white ..... *Tilia* 59
- L. Buds with 3 scales exposed, pith star-shaped in section (see 4th L). .... *Castanea* 40

- L. Buds (at least the fl. buds) with more than 3 scales exposed, pith roundish (sometimes 5-sided in *Carpinus*).  
 M. Buds blunt, stipule scars absent.  
   N. Brts. conspicuously ridged throughout their length; plant of salt marshes ..... *Baccharis* 66  
   N. Not as above.  
     O. Buds glabrous, fl. buds apparently on old wood; fr. a legume ..... *Cercis* 53  
     O. Buds pubescent, no distinction between lf. and fl. buds; fr. a samara ..... *Ailanthus* 54  
 M. Buds (at least the lf. buds) pointed, stipule scars present.  
   N. Bark of trunk smooth, fluted; buds not markedly at side of lf. scar; scales in 4 ranks ..... *Carpinus* 37  
   N. Bark of trunk scaly; buds at one side of lf. scar; scales in 2 ranks ..... *Ulmus* 43

## DISTINGUISHING CHARACTERS OF SPECIES

### GYMNOSPÉRMAE — GYMNOSPERMS

Seeds naked (*gymnos*, naked; *spermon*, seed); trees or shrubs with needle- or scale-like (in *Ginkgo* fan-shaped), mostly evergreen lvs.; in *Ginkgo*, *Larix*, *Pseudolarix*, and *Taxodium*, lvs. are deciduous.

### GINKGOÀCEAE — GINKGO FAMILY

#### GÍNKGO

(Pronounced with a soft or hard initial "G")

1. *G. biloba* L. Ginkgo. Dioecious; lvs. fan-shaped, often two-lobed (*biloba*), deciduous; short, thick, spur-like growths (short brs.) along the main brs.; seed with a thick, fleshy, outer coat, when ripe superficially resembling a yellow cherry. Native of China. Commonly cult.

### TAXÀCEAE — YEW FAMILY

#### TÁXUS — YEW

Seed solitary, surrounded by a red (rarely yellow), fleshy aril. Lvs. evergreen, linear, green or yellow-green beneath and paler than above, but without white bands; without resin ducts; distinctly petioled; midrib of lf. raised along upper surface. Dioecious, rarely monoecious; small trees, some vars. shrubby. Much cult.

2. *T. baccàta* L. English Yew. Lvs. come to a point gradually; brts., petioles, and under side of lvs. greenish; upper side of lvs. shining; scales of buds obtuse, not keeled.

3. *T. cuspidàta* Sieb. & Zucc. Japanese Yew. Lvs. abruptly pointed; brts. reddish brown when mature; petioles and stripes on under side of lvs. yellowish; upper side of lvs. dull; scales of buds acute, keeled.

A great many vars. of these two species are commonly cult.

The American Yew, or Ground Hemlock, \**T. canadénsis* Marsh., a low shrub, but sometimes 3-6 ft. high, is native in eastern N.A.; found in the Catskills and at one station on L.I., but not in Greater N.Y.

### PINÀCEAE — PINE FAMILY

The Pine Family, as represented in this vicinity, may be divided into 3 tribes, as follows:

1. The Fir Tribe (*Abietae*) including *Pinus*, *Larix*, *Picea*, *Abies*, *Tsuga*, and *Pseudotsuga*.

2. The Bald Cypress Tribe (Taxodiaceae) comprising *Taxodium* and *Sequoia* (*Cryptomeria* and *Sciadopitys* are exotic cult. genera).

*Sequòia* is a genus of two species: \**S. sempervirens* Endl., the Redwood, and \**S. gigantea* Decne., the Bigtree, both of them famous species of the Pacific Coast region.

3. The Cedar or Cypress Tribe (Cupresseae), with usually scale-like lvs., comprising *Chamaecyparis*, *Thuja*, and *Juniperus*.

#### ABIÈTEAE — FIR TRIBE

Lvs. spirally arranged, fascicled, or whorled; needle-like or linear; cone scales borne in the axils of bracts.

#### PINUS — PINE

Lvs.<sup>1</sup> long, needle-like, evergreen, in our species in fascicles of two or more. The common native species of Greater N.Y. and immediate vicinity are *P. Strobus* and *P. rigida*.

4. *P. excelsa* Wall. Himalayan Pine. 5 lvs. in a fascicle; long (4–7 in.) and drooping; cones 6–10 in. long, thicker than in the following species. B.B.G., N.Y.B.G., Pros. Pk.

5. *P. Stròbus* L. Northern White Pine. 5 lvs., shorter (2½–5 in.) than in the last, and only slightly drooping; cones long (3½–8 in.), chiefly near top of tree. B.B.G., Pal., Pel. Pk., V.C. Pk.

6. *P. nigra* Arnold. Austrian Pine. Lvs. in 2's, long (3–6 in.), heavy, dark green. Native in southern Europe. Commonly cult.

7. *P. sylvestris* L. Scotch Pine. Lvs. in 2's, of medium length (1½–3 in.), blue-green; inner bark shows orange color. Native in Europe and Siberia. Commonly cult.

8. *P. montana* Mill. var. *Mùghus* Willk. Mugho Pine. Lvs. in 2's, very short and stout (¾ to 2 in. long); habit dwarf and shrubby. Native in southern Europe. Commonly cult.

9. *P. rigida* Mill. Pitch Pine. Lvs. in 3's; cones short, on any part of the tree, and persistent. Common on L.I.

10. *P. virginiana* Mill. Virginia (or Scrub) Pine. Lvs. in 2's, of medium length (1½–3 in.). Occurs at one station on S.I.

The Norway Pine, \**P. resinosa* Ait., also called the Red Pine, is an American species common in northern N.Y. State, northern New England, and Canada. It closely resembles the Austrian pine, but its lvs. (2 in a fascicle) are more slender, and its cone scales are without the short prickles typical of the Austrian. Its bark has a reddish tinge (hence the common name) somewhat like that of the Scotch pine. Although it grows southward in the mountains of Pa. and W. Va., its nearest locality to N.Y. City is in Greene County among the Catskills, several miles above Kingston.

<sup>1</sup> Strictly, these are the *secondary* lvs., borne in a whorl (fascicle) on a very short br., which is subtended by a scale-like *primary* lf.; these scale lvs. are more prominent in the bud stage, there functioning as bud scales.

## CÉDRUS — CEDAR

Lvs. acicular, 3-sided, mainly in dense, whorl-like clusters on short, spur-like brs. Much like *Larix*, but lvs. are evergreen and cones much larger.

11. *C. atlántica* Manetti. Atlas Cedar. Habit of tree is stiff; lvs. bluish green; cones erect on the brs., about 2–3 in. long and  $1\frac{1}{2}$  in. in diam. A species rather rare in cult. Native in northern Africa. B.B.G.

The other two species are the Cedar of Lebanon, of Biblical fame, *C. libanótica* Link (of which there was, until 1935, a superb, large specimen in Flushing); and the Deodar Cedar of the Himalayas, *C. Deodara* Loud., which is not hardy here.

## LÀRIX — LARCH

Lvs. deciduous, borne mainly in whorl-like clusters at the ends of short, spur-like brs.; *cones persistent*.

12. *L. decídua* Mill. (*L. europæa* DC.). European Larch. Cones  $\frac{3}{4}$  to  $1\frac{1}{2}$  in. long; cone scales slightly downy outside, 40–50 to a cone. The species commonly seen in parks and private grounds. Kis. Pk., Pal., Pel. Pk.

13. \**L. laricina* (DuRoi) Koch (*L. americana* Michx.). Tamarack. Cones  $\frac{1}{2}$  to  $\frac{3}{4}$  in. long; cone scales smooth outside, 12–15 to a cone; lvs. about as in last ( $\frac{3}{4}$  to  $1\frac{1}{4}$  in.). Prefers moist soil and grows in abundance in the swamps of the northern States. Occasionally, however, it takes kindly to cult. in drier soil.

## PSEUDOLARIX — GOLDEN LARCH

Lvs. deciduous, borne mainly in whorl-like clusters at the ends of spur-like brs. Much like the true larch (*Larix*), but with *cone scales deciduous*, leaving the axis of the cone standing on the tree; the spur-like brs. and the lvs. are longer than in *Larix*.

14. *P. Kaempferi* Gord. (*P. amabilis* Rehd.). Golden Larch. The only species. Native in China. B.B.G., Pros. Pk.

## PÍCEA — SPRUCE

Lvs. (in our species) 4-sided, acicular, borne on short peg-like projections on the stem, which remain when the lvs. are shed, giving brs. a rough appearance and feel; *cones pendulous*, their scales persistent.

15. *P. Àbies* Karst. (*P. excélsa* Link.). Norway Spruce. The commonly cult. spruce, recognized by its long cones (4–6 in.) and pendulous brts., which are glabrous. A multitude of vars. and forms in cult. Native in northern and central Europe. B.B.G., N.Y.B.G., Pal.

16. *P. orientális* Carr. Oriental Spruce. Lvs. very short, blunt, shining; brts. pale brown, short-pubescent; cones  $2\frac{1}{2}$ – $3\frac{1}{2}$  in. long. Native in

Asia Minor and the Caucasus region. Occasionally cult. B.B.G., N.Y.B.G., Pros. Pk.

17. \**P. púngens* Engelm. (*P. Parryana* Sarg.). Blue Spruce. Lvs. stiff, sharp, blue; brts. glabrous. Often cult.; with many vars., of which the Koster Spruce (var. *Kosteri*) is a popular one. Native in Colo., Utah, and Wyo. Probably the best species for planting in a dry climate. B.B.G., N.Y.B.G., Pros. Pk.

The White Spruce, \**P. glauca* Voss (*P. canadensis* (Mill.) B.S.P.); the Red Spruce, \**P. rubra* Link; and the Black Spruce, \**P. mariana* (Mill.) B.S.P., are the common native species of the northeastern U.S.; the first two, especially the first, are occasionally seen in cult. in Greater N.Y. The white spruce has glabrous brts. and might be mistaken for the Norway, but it has glaucous lvs., and its brts. lack the pendent character of those of the Norway, giving the tree a much stiffer aspect, and the cones are much smaller,  $1\frac{1}{2}$ -2 in. long. Both the red and the black spruce have glandular-pubescent brts., and small cones similar to those of the white spruce, but differing in color and other details. The black spruce is a typical swamp species, with cones long persistent. It may be seen in a swamp near Merrick, L.I. All these three species are common farther north.

#### ABIES — FIR

Lvs. linear, flat, with two white lines beneath; leaving a circular scar with a dot in the center when they fall. *Cones erect*, falling off scale by scale, leaving the persistent axis.

18. *A. Nordmanniana* Spach. Nordmann Fir. Lvs. notched at tip; buds not resinous. Native in Greece, Asia Minor, and the Caucasus region. Commonly cult., and grows well in Greater N.Y. B.B.G., N.Y.B.G., Pros. Pk.

The Balsam Fir, \**A. balsamea* (L.) Mill., common in northern New England and northern N.Y. State (also found in the mountains to W.Va., and west to Minn. and Iowa) does not take kindly to cult. in Greater N.Y. It may be recognized by its very resinous buds and fairly short lvs.,  $\frac{3}{4}$ -1 in. long, disposed usually (but not always) in fairly flat series on each side of the br. (although in reality inserted spirally). Very popular as a Christmas tree. The White (or Silver) Fir, \**A. concolor* Lindl. & Gord., of the western U.S., is occasionally cult. here; while it also has resinous buds, it is characterized especially by its long, curved, bluish lvs.

#### TSUGA — HEMLOCK

Lvs. linear, flat, with two white lines beneath, and distinct short petioles. (The lvs. of *Abies*, the fir, which resembles this, have no distinct petioles, although they are much contracted at the base.)

19. *T. canadensis* (L.) Carr. Eastern Hemlock. Lvs. blunt at tip; usually several small lvs. occur upsidedown along brt. The only common native species in the eastern U.S.; grows on rocky ridges and in rocky ravines. Inw., N.Y.B.G., Pal., V.C. Pk. Weeping and other vars. occur in cult.

## PSEUDOTSÛGA

20. \**P. taxifolia* (Lam.) Britton (*P. Douglasii* Carr.). Douglas Fir. Buds red-brown, smooth, sharp-pointed; lvs. linear, with two grayish lines beneath; lf. scars circular, somewhat as in *Abies*, but tilted at an angle from the twig. The characters of the buds and lf. scars are very distinct and are important for the recognition of this species. Native in the mountains of western N.A. Much cult. in several vars. in Greater N.Y., and grows well here. B.B.G., N.Y.B.G.

## TAXODIÆAE — BALD CYPRESS TRIBE

Lvs. linear, spirally arranged (whorled in *Sciadopitys*); cones without bracts.

## TAXODIUM — BALD CYPRESS

Brts. of two kinds: those near tip of shoot persistent and with buds in the axils of the lvs.; those on lower part of shoot without axillary buds and deciduous. Buds very small, globular, scaly. Lvs. small, flat, yellow-green on both sides; those on persistent brts. projecting radially; those on deciduous brts. appearing as if 2-ranked.

21. \**T. distichum* (L.) Richards. Southern Cypress (Bald Cypress). Twigs more or less horizontal. Native in swamps of southeastern U.S. Grows well in moist soil. B.B.G., N.Y.B.G., Pros. Pk.

Some good specimens of the Pond Cypress, \**T. ascendens* Brongn., may be seen at the N.Y. Botanical Garden, to the southeastward of the conservatories, where they may be compared with *T. distichum* nearby. The pond cypress has more upright brs. and much narrower lvs. than the commoner species.

## SCIADÓPITYS — UMBRELLA PINE

22. *S. verticillata* Sieb. & Zucc. Umbrella Pine. Lvs. (said to be the morphological equivalent of 2 connate pine needles) long, linear, evergreen, borne in whorls, each lf. in the axil of a little scale. Native in Japan. B.B.G., N.Y.B.G.

## CRYPTOMÉRIA

23. *C. japonica* D. Don. Cryptomeria. Lvs. very short, awl-shaped, curved, evergreen, strongly decurrent on the stem. B.B.G., N.Y.B.G.

## CUPRÉSSEAE — CYPRESS OR CEDAR TRIBE

Lvs. usually small and scale-like, sometimes acicular; decussately opposite or in whorls of 3; cone scales opposite or in whorls of 3.

## CHAMAECÝPARIS — WHITE CEDAR

Lvs. small and scale-like (awl-shaped or linear in some vars.); in the Japanese species listed below, whitened beneath. Cones composed of

shield-shaped scales (the stalk of the scale being produced from the center of its under surface), the scales being fitted together in such a way that the whole forms a little ball. The Japanese species and vars. are much cult. in Greater N.Y. The native species, inhabiting swamps, does not do so well in cult.

24. *C. pisífera* Sieb. & Zucc. Sawara Cypress (*Retinospora*). Cones small ( $\frac{1}{4}$  in. in diam. or slightly larger), brown. Native in Japan. B.B.G., N.Y.B.G., Pros. Pk.

Vars. commonly cult. are:

25. *C. pisifera* var. *plumòsa* Beissn., with feathery or plume-like brts. and awl-shaped lvs. N.Y.B.G., Pros. Pk.

26. *C. pisifera* var. *squarròsa* Beissn. & Hochst., with spreading, linear lvs. N.Y.B.G., Pros. Pk.

27. *C. pisifera* var. *filífera* Beissn., with gracefully drooping, thread-like brs. N.Y.B.G., Pros. Pk.

28. *C. obtùsa* Sieb. & Zucc. Hinoki Cypress. Lvs. blunt or only short-pointed. Native in Japan. B.B.G., N.Y.B.G.

The native American species is the Southern White Cedar, *\*C. thyoides* (L.) B.S.P., which grows in swamps along the coast from Me. to Fla. and Miss. The lvs. are not whitened beneath and the cones are a trifle smaller and bluish bloomy when ripe. Abundant in a swamp at Merrick, L.I.; also found in swamps in N.J. not far from the Greater N.Y. region.

#### THÙJA — ARBOR VITAE

Lvs. tiny and scale-like; those on edges of brt. keeled; those on upper and lower surfaces flat. Cones small, constructed on the plan of the pine or spruce cone.

29. *\*T. occidentàlis* L. Northern White Cedar (*Arbor Vitae*). Cones  $\frac{1}{3}$ – $\frac{1}{2}$  in. long. Commonly cult. in Greater N.Y. Has been found in Westchester County and is very common in wet ground in the North.

The Oriental *Arbor Vitae*, *T. orientàlis* L., is easily recognized by the vertical plane in which the brts. are disposed. Commonly cult.

#### JUNÍPERUS — JUNIPER

Cone berry-like, the scales having become fleshy and welded together.

30. *J. virginiana* L. Eastern Red Cedar. Lvs. scale-like, in 4 rows, making the brts. 4-sided; but on young trees or on vigorous shoots, lvs. are needle-like. Fr. about  $\frac{1}{4}$  in. in diam., with a bloom. B.B.G., N.Y.B.G., V.C. Pk.

The Dwarf Juniper, *\*J. communis* L., with all its lvs. needle-like and in whorls of 3, is common northward. Found at one station on L.I. B.B.G.



## ANGIOSPÉRMAE — ANGIOSPERMS

Seeds enclosed in an ovary (*angion*, a vessel; *spermon*, seed); lvs. mostly broad (rarely needle- or scale-like); deciduous (rarely evergreen).

## LILIACEAE — LILY FAMILY

## SMILAX — GREEN BRIER

In woods and along fences and borders of fields two woody, climbing species of *Smilax* are common in this region. Being closely related to the lilies, they have no central pith, but the vascular bundles are distributed throughout the stem. These two species have perennial, aerial stems, which are usually green and prickly, and have a pair of tendrils near the base of the lf. stalk.

31. *S. rotundifolia* L. Green Brier. The commoner of the two; can be recognized by its thicker stems, stronger prickles, and lvs. rounded and *shining* on both surfaces. B. Ter., B.B.G., Inw., Pal., Pel. Pk., V.C. Pk.

32. *S. glauca* Walt. Saw Brier. Has more slender stems and prickles and ovate lvs. which are *glaucous* beneath. B. Ter., Pel. Pk.

## SALICACEAE — WILLOW FAMILY

Dioecious; both staminate and pistillate fls. in catkins; lvs. alternate (in *S. purpurea* often opposite), simple; bark bitter; wood light and soft.

## SALIX — WILLOW

Buds covered by a single hollow-conical scale, often more or less flattened against brt.; true terminal bud absent; lvs. mostly long and narrow.

33. *S. nigra* Marsh. Black Willow. A large tree; lvs. narrow, often scythe-shaped, green and smooth on both sides; petioles glandless. Grows in wet places. Kis. Pk., V.C. Pk.

34. *S. fragilis* L. Crack Willow. A large tree; lvs. very long-pointed, light green or blue-green and at length smooth beneath, serrate, with glands at base of blade; brs. and brts. very brittle, easily knocked off with the finger. Native in Europe. Kis. Pk., Pel. Pk.

35. *S. álba* L. European White Willow. A large tree; lvs. lanceolate, long-pointed, finely toothed, *silky pubescent* and white beneath, in one var. *silky pubescent* also above; brts. *greenish*. Native in Europe. B.B.G., Inw.

36. *S. álba* L. var. *vitellina* (L.) Koch. Golden Willow. A large tree, more common than the last. *Mature lvs.* similar, but *smooth*; whitish beneath. Brts. *yellow*. Inw., Kis. Pk.

37. *S. babylónica* L. Babylon Weeping Willow. May be recognized by its very long, slender, olive-brown, drooping brts. Native in Europe. Often cult. B.B.G., Kis. Pk., Pal., V.C. Pk.

38. °*S. cordàta* Muhl. Heart-leaf Willow. A shrub with finely serrate lvs., green beneath and cordate (at least some of them) at base; stipules long persistent. Inw., Kis. Pk., Pal., V.C. Pk.

39. *S. discolor* Muhl. Pussy Willow (Glaucous Willow). Usually a shrub; fl. buds much larger than lf. buds and opening early; lvs. smooth and glaucous beneath, irregularly serrate. B. Ter., Pel. Pk., V.C. Pk.

40. °*S. humilis* Marsh. Prairie Willow. A small, low shrub; lvs. oblanceolate or oblong-lanceolate, tomentose beneath; buds and brts. hairy. Occasional on S.I. B. Ter.

41. *S. rostràta* Richards. Beak Willow. A large shrub or small tree; lvs. with conspicuous veins, somewhat sunken below upper lf. surface, obovate to elliptic-lanceolate, usually pubescent beneath. Rare in Greater N.Y. Pel. Pk.

42. °*S. sericea* Marsh. Silky Willow. A shrub, 6–12 ft. high; lvs. narrow, finely serrate, silky beneath. Very common in swamps, and growing in large colonies. V.C. Pk., Kis. Pk.

The following species are also found in this region: the Shiny Willow, *S. lucida* Muhl., with brts. and long-pointed lvs. shining (Pel. Pk.); the Dwarf Gray W., °*S. tristis* Ait., closely related to *S. humilis*, but smaller; the Sage W., °*S. cándida* Flügge, with brts. and under side of lvs. white-woolly; the Purple W. or Purple Osier, °*S. purpùrea* L., with smooth brts. purplish when young, becoming gray, and with oblanceolate, often opposite lvs. The last species, a native of Europe, was originally cult., but now naturalized; B.B.G.

#### PÓPULUS — POPLAR

Buds with many scales; true terminal bud and stipule scars present; bark very bitter; pith 5-angled; lvs. in general broader than in *Salix*; bark on young trees and brs. smooth and pale, gray or yellowish, but dark and rough on old trunks.

43. *P. álba* L. White Poplar. Young brts. and under surface of lvs. with a white, felty covering; lvs. rhombic; buds more or less woolly; young bark very pale gray or nearly white; dark, rough bark appears later than in other species of *Populus*. Native in Europe. Kis. Pk., N.Y.B.G., Pel. Pk., Pros. Pk.

44. *P. tremuloìdes* Michx. Aspen (Quaking Aspen). Common in forests, usually in rather dry locations. Lvs. ovate to rounded, with small, regular teeth; petioles flattened; buds narrow, very sharp-pointed, shining as if varnished, appressed close to brt.; young bark often more yellowish than that of last species; old bark nearly black. B. Ter., Pel. Pk., V.C. Pk.

45. *P. grandidentata* Michx. Largetooth Aspen. Lvs. round-ovate, with large, irregular teeth; buds plumper than in the last, somewhat downy; young bark usually more distinctly yellow than that of the last. Common in forests. B. Ter., Inw., Pel. Pk., V.C. Pk.

46. *P. deltoïdes* Marsh. Eastern Cottonwood. Lvs. deltoid in shape; brts. yellowish, often showing 3 ridges extending downward below lf. scars; buds large, smooth, with a yellow resin within; young bark much like that of the last; old bark grayish. Often cult. on account of its rapid growth. Pal.

47. *P. nigra* L. var. *italica* Du Roi. Lombardy Poplar. A species much cult., and easily recognized by its erect, columnar habit; lvs. comparatively small, usually wider than long. B.B.G.

The Balm-of-Gilead Poplar, *P. cândicans* Ait., with large, sticky, fragrant buds, and with brts., petioles, and under side of broadly ovate lvs. (especially on the veins) pubescent, or at least the margins of the lvs. ciliate, is also occasionally seen. E.B.G., Pal. The Carolina Poplar, *P. Eugènei* Dode, often planted (only in the staminate form) as a street tree, and of pyramidal habit, is said to be the result of a cross between *P. deltoïdes* and *P. nigra*. Similar forms with a different parentage probably also occur.

## MYRICACEAE — SWEET GALE FAMILY

### MYRICA

48. *°M. caroliniensis* Mill. Bayberry. Lvs. aromatic, falling late; brts. and buds with long black hairs (seen under lens) and dotted with yellow resin glands; *bud globose*, about  $\frac{1}{12}$  in. in diam.; staminate catkins enclosed in the winter buds; fr. grayish white, waxy. B. Ter., B.B.G., Pal., Pel. Pk.

The Sweet Gale, *°M. Gâle* L., occurs on L.I.; a usually larger shrub, with similar lvs., but with resin-dotted fr. in cone-like bunches at the ends of the brts., and with *usually pointed buds*. B.B.G. The Sweet Fern, *°M. asplenifolia* L., with fragrant, more or less deeply cleft, fern-like lvs., is common on L.I. and S.I. B.B.G. In both of these species the staminate catkins are exposed during the winter, and are more or less erect.

## JUGLANDACEAE — WALNUT FAMILY

Lvs. of hickory and walnut, our two genera in this family, pinnately compound; true terminal bud present; fr. a nut enclosed by an outer husk; large forest trees.

### JUGLANS — WALNUT

Husk of fr. not splitting when ripe; *pith chambered*; buds naked; lf. scars shield-shaped or 3-lobed; stipule scars lacking; lf. numerous (11-23).

49. *J. cinèrea* L. Butternut. Transverse, downy pads above *triangular lf. scars*; buds gray-brown; pith dark brown; nuts long; lfts. 11-17; bark with broad, light, smooth, lengthwise stripes. Inw., Pal., V.C. Pk.

50. *J. nìgra* L. Black Walnut. *Lf. scars heart-shaped*; buds grayish; pith lighter brown; nuts spherical; lfts. 13-23; bark dark and rough, without stripes. B.B.G., Inw., N.Y.B.G., Pal., Pel. Pk., Pros. Pk.

### CÀRYA (HICÒRIA) — HICKORY

Husk of fr. splitting open into 4 valves, at least part of the way down from apex, when ripe; *pith not chambered*; buds (except in *C. cordiformis*) scaly; lf. scars shield-shaped or 3-lobed; stipule scars lacking; lfts. (5-11) usually fewer than in *Juglans*. Forms of *C. glabra* and *C. alba* sometimes occur, and are difficult to determine with exactness; *C. ovata* and *C. cordiformis* are quite distinct.

51. *C. ovàta* (Mill.) K. Koch. Shagbark Hickory. Bark shaggy; buds of medium size, with *outermost scales produced into long points*; *husk of fr. thick, splitting readily to base*; nut white, kernel sweet; the hickory nut of commerce; lvs. downy below when young, later usually smooth, with usually 5 lfts. (sometimes 7). B. Ter., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., V.C. Pk.

52. *C. álba* (L.) K. Koch. Mockernut Hickory. Bark close, i.e., not readily peeled off with the fingers; *buds large*, the terminal one  $\frac{1}{2}$ - $\frac{3}{4}$  in. long, outer scales early deciduous; *brts. stout and thick*, usually pubescent; husk of fr. thick, not splitting to base; nut light brown, shell thick; lvs. pubescent below, with 5-7, often 9 lfts., fragrant when crushed. B. Ter., Inw., N.Y.B.G., Pal., Pel. Pk., V.C. Pk.

53. *C. glàbra* (Mill.) Spach. Pignut Hickory. Bark scaly; buds smaller ( $\frac{1}{3}$ - $\frac{1}{2}$  in. long), outer scales early deciduous; *brts. slender, smooth*; fr. obovate, husk thin, not splitting more than halfway to base; lvs. smooth, with usually 5 lfts. (may have 3-7), smaller than in the last. B. Ter., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., V.C. Pk.

Another species of pignut, the Small Pignut, *C. ovàlis* Sargent (*H. ovalis* (Wang.) Sudworth), is also recognized, characterized by small (about 1 in. long), ovoid fr. with a *thin, scaly husk*, which splits tardily to near the base, and by bark which is often shaggy on old trunks; lfts. 5-7; both lfts. and brts. scurfy-pubescent while young, glabrous when mature. Several vars. of this species, depending on the size and shape of the fr., are described. Here belongs *H. microcarpa* Britton.

54. *C. cordifórmis* (Wang.) K. Koch (*H. mínima* Britton). Bitternut Hickory. Bark close; *buds sulphur-colored, naked*; *husk and shell of nut thin*, kernel bitter; lfts. numerous (7-11). Closely related to \**C. pècan*, the pecan nut of the southern States. C. Pk., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., V.C. Pk.

## BETULACEAE — BIRCH FAMILY

Monoecious; staminate and pistillate fls. in catkins, except in *Corylus*, where the pistillate fls. are in short, few-flowered heads; staminate catkins naked throughout the winter in all genera except *Carpinus*; pistillate catkins naked throughout the winter only in *Alnus*, in other genera enclosed in the buds. The naked catkins are a conspicuous winter character, and are therefore an easy means of identification of membership in this family. Lvs. simple, alternate, usually doubly serrate.

## CORYLUS — HAZELNUT

Shrubs; staminate catkins gray, pendulous; buds somewhat flattened, blunt, with 4-6 scales exposed; true terminal bud lacking; lvs. often in 3 ranks. Stipule scars present, unequal.

55. *C. americana* Walt. Hazelnut (American Hazelnut). Brts. and petioles with stiff, glandular hairs; lvs. oval, pointed, downy below; fr. enclosed in a broad involucre. B.B.G., C. Pk., Kis. Pk., V.C. Pk.

56. *C. rostrata* Ait. Beaked Hazelnut. Brts. more slender than in the last, smooth or only slightly hairy; lvs. broader than in the last; fr. with a long, tube-like involucre. Not common in Greater N.Y. Native in Canada and in northern and central U.S. B.B.G., Pel. Pk., V.C. Pk.

## OSTRYA — HOP-HORNBEAM

57. *O. virginiana* (Mill.) K. Koch. Hop-hornbeam. Small tree, with bark in long, narrow, loose, ragged, vertical strips; buds ovoid, generally tinged with green, about 6 striate scales exposed; true terminal bud lacking; staminate catkins, often in 2's or 3's, present on mature trees; lvs. oblong-ovate, sharp-pointed, slightly hairy on both sides; frs. enclosed in bladder-like sacs which occur in cone- or hop-like clusters. C. Pk., Inw., N.Y.B.G., Pal., Pros. Pk.

## CARPINUS — BLUE BEECH

Neither staminate nor pistillate catkins evident during the winter, both being enclosed in the buds; buds small, pointed, with 10 to 12 scales exposed in 4 rows; true terminal bud lacking; stipule scars present; frs. in loose, pendulous clusters, each individual nut-like fr. subtended by a three-lobed bract; bark smooth, fluted (with muscle-like ridges).

58. *C. caroliniana* Walt. Blue Beech (American Hornbeam). Bark steel-gray. Likely to be confused with *Ostrya* when young, but the lvs. are entirely smooth above, and the buds are smaller, reddish, usually angled, and show more scales; also, catkins are absent. B.B.G., C. Pk., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

59. *C. Bétulus* L. European Hornbeam (European Blue Beech). A larger tree (60–70 ft.) than the American species (30–40 ft.); lvs. thicker, with veins sunken in upper surface, turning yellow in fall, and often persistent all winter; bracts large,  $1\frac{1}{2}$  in. long (in American, 1 in. long), margin of bract nearly entire; buds longer ( $\frac{3}{4}$  in.) than in American ( $\frac{1}{6}$  in.). B.B.G., C. Pk., common in Pros. Pk. Cult. vars. occur.

### BÉTULA — BIRCH

Staminate catkins conspicuous in winter on mature trees, pendulous; bark marked by horizontally elongated lenticels; dwarf shoots numerous along 2-year-old or older twigs; terminal bud lacking except at tips of the numerous dwarf shoots; buds with 2–3 scales showing; stipule scars narrow; frs. in compact cylindrical spikes, each individual fr. (or winged nut) subtended by a 3-lobed bract.

60. *B. lénta* L. Sweet Birch. Bark dark brown; twigs with strong wintergreen flavor; buds sharply pointed and long ( $\frac{1}{4}$  to  $\frac{1}{2}$  in.); fr. bracts smooth. Has lvs. like *Ostrya* and *Carpinus*, with which it may be confused when young; but it can always be distinguished by the taste of the nearly smooth brts. B. Ter., B.B.G., Inw., Kis. Pk., N.Y.B.G., Pal., Pros. Pk., V.C. Pk.

61. *B. lùtea* Michx. f. Yellow Birch. Bark peeling into thin, silvery yellow, ribbon-like layers; twigs with wintergreen flavor (but not so strong as in the last), pubescent, at least when young; lvs. like the last; spikes of fr. a little thicker and shorter; fr. bracts pubescent. A native tree in Greater N.Y., but rare. B.B.G., N.Y.B.G., V.C. Pk.

The River Birch, *B. nigra* L., is common along rivers just south and west of N.Y. City (e.g., Delaware R. and N.J. streams); has curly, papery, reddish bark, and rhombic lvs., bluish beneath. Sometimes cult.

62. *B. populifolia* Marsh. Gray Birch. Bark dirty white, not chalky, nor dividing readily into thin layers; lvs. triangular, very long-pointed; buds short, about  $\frac{1}{4}$  in.; brts. roughened with resin dots; a small tree, typically with several oblique trunks from a single base. Very common. B. Ter., Kis. Pk., N.Y.B.G., Pal., V.C. Pk.

63. \**B. papyrifera* Marsh. (*B. álba* L. var. *papyrifera* (Marsh.) Spach). Paper Birch (Canoe Birch). Similar to the gray birch so commonly growing wild in Greater N.Y., but the lvs. are ovate; the brts. pubescent; the bark chalky white, separable into thin layers; and the tree is larger, with usually a single main trunk. A northern species. Not known in Greater N.Y. except in cult. B.B.G.

64. *B. péndula* Roth (*B. verrucòsa* Ehrh.). European Birch. The common, cult. white birch. Bark rather dirty white; brts. with resin

glands, not pubescent; lvs. rhombic-ovate. The cut-leaved horticultural var. *gracilis* Rehd. is the one most commonly seen. B.B.G.

Another white-barked European species often cult. is *B. pubescens* Ehrh., with glandless, *pubescent brts.*, and lvs. much like those of *B. pendula*.

### ÁLNUS — ALDER

Buds, in our species, stalked, covered by 2 or 3 valvate or nearly valvate scales; both staminate and pistillate catkins naked and conspicuous during the winter; old fr. heads (cone-like) also persistent; true terminal bud and stipule scars present.

65. *°A. incana* (L.) Moench. Speckled Alder. Lvs. ovate, downy and glaucous beneath, doubly serrate; bark speckled with large lenticels; *pistillate catkins recurved*, apparently lateral. Often grows in drier soil than the next. B.B.G.

66. *°A. rugosa* (DuRoi) Spreng. Smooth Alder (Hazel Alder). Lvs. green on both sides, almost regularly serrate, narrowing somewhat at their bases; *pistillate catkins erect*, apparently terminal. Usually in moist soil. B. Ter., B.B.G., Inw., Kis. Pk., V.C. Pk.

These two alders often grow in the same habitat, but are usually easily distinguished, although intermediate forms sometimes occur.

### FAGACEAE — BEECH FAMILY

Mainly trees (a few are shrubs) with alternate, simple lvs.; characterized particularly by the fr., a nut, more or less surrounded by a woody or spiny involucre — the cup of the acorn, or the bur of the chestnut or beech.

### FAGUS — BEECH

Easily recognized by the very long (sometimes nearly an in.), narrow, cylindrical, sharp-pointed buds; stipule scars linear, nearly meeting around brt.; true terminal bud present; bark light gray and smooth; in winter the pale, dead lvs. tend to persist on the tree; nuts triangular, usually two in a spiny bur, the involucre. Only one species (*F. grandifolia*) is native in the U.S. The European species, *F. sylvatica*, and its vars., are commonly cult.

67. *F. grandifolia* Ehrh. Beech (American Beech). Lvs. ovate-oblong, long-pointed, coarsely serrate,  $2\frac{1}{2}$ –5 in. long, with 9–14 pairs of veins. B.B.G., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., V.C. Pk.

68. *F. sylvatica* L. European Beech. Lvs. similar, but 2–4 in. long, with only 5–9 pairs of veins, and with smaller teeth than in the American species; bark somewhat darker than in the latter. B.B.G., C. Pk., Pros. Pk., V.C. Pk.

Vars. of the European beech commonly planted in parks are:

69. *F. sylvatica* L. var. *purpurea* Ait. Copper or Purple Beech. Lvs. copper-colored or purple, changing to dark green in late summer. C. Pk., Pros. Pk.

70. *F. sylvatica* L. var. *incisa* Hort. Cut-leaved European Beech. Lvs. deeply and variously cleft and toothed. C. Pk., Kis. Pk., Pros. Pk., V.C. Pk.

71. *F. sylvatica* L. var. *péndula* Loud. Weeping European Beech. Brs. drooping. A famous specimen, perhaps the largest in the U.S., is in Flushing.

#### CASTÀNEA — CHESTNUT

Characterized particularly by the fr., 1-3 rounded nuts in a spiny bur, the involucre; and by the lvs., like those of the beech, but longer, wider, and with longer, sharper teeth. The American species is now rare in this part of its range, having been killed by a parasitic fungus brought into the U.S. from the Orient; but young shoots are occasionally seen in Greater N.Y., growing from the old roots, which have persisted because of their greater resistance to the disease.

72. *C. dentàta* (Marsh.) Borkh. Chestnut (American Chestnut). Buds blunt, ovoid, light to dark brown, with only 2 or 3 scales showing; true terminal bud frequently lacking; stipule scars elongated, unequal; on erect shoots lvs. usually in 5 ranks, on lateral shoots in 2 ranks; pith star-shaped in section; bur about the size of a small apple.

#### QUÉRCUS — OAK

Characterized by a cluster of buds toward the end of the brt., the bud scales being numerous and in 5 ranks; by simple lvs., lobed or cleft in the majority of the species; and by the fr., known as the acorn. Here the involucre (the cup of the acorn) does not entirely enclose the fr. as in the beech and chestnut. Stipule scars small; pith star-shaped in section. Although there are many subdivisions, for convenience two main groups of oaks may be recognized in this region, as follows:

##### WHITE OAKS

Leaf lobes rounded, without bristle tips (sharp-pointed in Nos. 76 and 79).

Buds blunt (except in chestnut oak).

Acorns mature first year (except in Turkey oak).

##### BLACK OAKS

Leaf lobes with bristle tips.

Buds more or less sharp-pointed.

Acorns mature second year.<sup>1</sup>

<sup>1</sup> On this account all species of the black oak group, if old enough to bear fr., will be found in any given autumn to have two sizes of nuts: those of the current year, still tiny, and those in their second year, now ripening.



## SPECIES IN THE WHITE OAK GROUP

73. *Q. álba* L. White Oak. *Buds smooth and blunt*; bark light gray and scaly; brts. smooth, usually reddish brown at maturity, often glaucous; acorns ovoid-oblong, cups shallow; lvs. deeply lobed, pale and smooth below; dead lvs. often persist on tree in winter. Var. *latilòba* Sarg. is the form most generally seen in this vicinity; in this the lf. lobes are broad, and extend less than halfway to the midrib. B. Ter., B.B.G., C. Pk., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

74. *Q. stellàta* Wang. Post Oak. Buds pubescent and blunt; brts. stout, tomentose; bark of trunk red-brown, or sometimes lighter, scaly; acorns small, with hemispherical cups; lvs. with squarish lobes, pubescent beneath; small tree. Common on L.I. and Hunter's I. Pal.

The Bur Oak, *\*Q. macrocárpa* Michx., with light colored, scaly bark, and large acorns, their cups with fringed borders, has lvs. separated into 2 parts (upper and lower) by a pair of deep sinuses  $\frac{1}{2}$  or  $\frac{2}{3}$  of the way down lf., and is often cult. Native in central and northern N.Y. State. B.B.G., C. Pk., Pros. Pk.

75. *Q. bicòlor* Willd. (*Q. platanoides* Sudworth). Swamp White Oak. Buds blunt, with fine capillary scales often present in the terminal bud cluster; brts. at length smooth and yellowish; lvs. narrower and entire towards the base, tomentose beneath, with numerous rounded lobes, but these usually not so deep as in *Q. álba* (rarely lobed halfway to midrib); bark exfoliating on young portions of brs. B.B.G., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., V.C. Pk.

76. *Q. prinoides* Willd. Dwarf Chinquapin Oak. A dwarf species; brts. brittle, slender, smooth; buds small, very blunt; lvs. of the chestnut oak type, regularly crenately toothed, gray-downy beneath. Found on S.I. (nr. Arlington) and L.I.

77. *Q. montàna* Willd. (*Q. Prinus* L. of Gray's Manual). Chestnut Oak. Buds yellowish, smooth, pointed; bark not flaky, dark brown, in mature trees with deep, more or less vertical grooves, v-shaped in cross section; cup somewhat warty, but thin, covering  $\frac{1}{3}$ – $\frac{1}{2}$  of acorn; lvs. with numerous, regular, rounded teeth. B. Ter., Hunter's I., Inw., Pal.

78. *Q. Ròbur* L. English Oak. Brts. glaucous, usually reddish above, green beneath; buds short, thick, blunt. Resembles *Q. álba* in some respects, but lvs. are smaller, often with ear-like lobes at base. The acorns ripen the first year, and although the bark is dark colored, this species is closely related to the white oak. B.B.G., Kis. Pk., commonly cult.

79. *Q. Cérris* L. Turkey Oak. Capillary scales of buds numerous; lvs. with shallow, abruptly pointed lobes; acorn (about 1 in. long) with large "mossy" cup, ripening the second year; bark dark colored and rough. Native in southeastern Europe and western Asia, and rarely cult. here. Several vars. cult. C. Pk., Pros. Pk.

## SPECIES IN THE BLACK OAK GROUP

80. *Q. borealis* Michx. f. (*Q. rubra* L. var. *ambigua* (Michx. f.) Fernald). Red Oak. Buds large, those at tip of brt. about  $\frac{1}{4}$  in. long or more, red- or dark-brown and usually shining; rounded on the sides (not strongly angled), somewhat pubescent towards the pointed tip. Lvs. with numerous bristle-tipped lobes which are more or less triangular in rough outline; *smooth beneath* except for occasional tufts of hairs in axils of veins. Brts. usually strongly ridged or fluted. Acorns large, about 1 in. long, with cup-shaped cups covering about  $\frac{1}{3}$  of acorn. The bark of old trunks is the smoothest of all our oaks, vertically grooved, but with smooth, light-colored strips between the grooves. The red oak is a common tree with us, especially in rocky situations; it is a vigorous, fast grower, and is best recognized by the red, shining buds, the many-lobed (7-11) lvs., the sinuses varying considerably as to depth, and the large acorns. Var. *máxima* Sarg., common in this vicinity, has larger acorns and *flat, saucer-shaped cups*. B. Ter., B.B.G., C. Pk., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

81. *Q. palústris* Muench. Pin Oak. Buds about  $\frac{1}{8}$  in. long, sharp-pointed, angled, entirely smooth and usually shining, brown; *many short, pin-like brs. throughout tree*; lower main brs., especially in younger trees, droop characteristically downward; lvs. small and deeply cleft, the lobes often standing out nearly at right angles to the long axis of the lf.; *acorns very small*, about  $\frac{1}{2}$  in. in diam., often striped, nearly hemispherical, with *flat cups*. Best recognized by its smooth, sharp-pointed buds, pin-like brs., and small acorns with flat cups. Prefers moist soil. Much planted as a street tree and in parks and estates. B. Ter., B.B.G., C. Pk., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

82. *Q. coccínea* Muench. Scarlet Oak. Buds  $\frac{1}{8}$ - $\frac{1}{4}$  in. long, fairly smooth and reddish brown at base; gray and distinctly pubescent above middle, and pointed at tip. Lvs. scarlet in the fall, hence the name; shaped as in pin oak, but larger; lobes less numerous than in red oak. Acorn with hemispherical cup and white meat. *Inner, living bark not yellow*, but reddish or pinkish; outer bark black and rough. Apt to be confused with the pin oak, but lacks the pin-like brs., and its buds are larger and pubescent in the upper half. Also may be mistaken for the black oak. B. Ter., B.B.G., Inw., Pal., Pros. Pk.

83. *Q. velútina* Lam. Black Oak. Buds large, of about the dimensions of those of the red oak, but 5-angled or -sided, grayish-pubescent. Brts. apt to be downy or scurfy. Lvs. usually pubescent or scurfy below, with prominent tufts of hairs in axils of veins; with fewer lobes than in red oak, (7-9) usually 7, and lobes more oblong. Acorns have hemispherical cups and yellow meat. *Inner, living bark bright orange-yellow*; hence

tree sometimes called yellow oak; outer bark of old trunks rough and black, divided into polygonal chunks. Best recognized in winter by its stout, entirely grayish-hairy, angled buds; by these and by its yellow inner bark it can be distinguished from the scarlet oak, with which it may be confused. B. Ter., B.B.G., C. Pk., Inw., Kis. Pk., Pal., Pros. Pk., V.C. Pk.

84. *Q. ilicifolia* Wang. Bear or Scrub Oak. A dwarf species usually about 6 ft. in height, but sometimes attains 20 ft.; much branched and spreading; lvs. semipersistent, very variable in shape, tomentose beneath; brts. minutely downy; buds short, pointed, shining; acorns small, about  $\frac{1}{2}$  in. high, with saucer-shaped cups. In barren soil on L.I. and S.I., and along the tops of the nearby ridges in N.Y. and N.J. B.B.G.

The Blackjack Oak, *Q. marilandica* Muench., occurs on L.I. and S.I. Best recognized by the very broadly obovate, almost triangular outline of its lvs.; buds about  $\frac{1}{4}$  in. long, pointed, pubescent, red-brown.

85. *Q. Phellos* L. Willow Oak. Buds sharp-pointed, about  $\frac{1}{8}$  in. long; acorns much like those of the pin oak; best recognized by its long, narrow, willow-like lvs. A rare species in this vicinity but occasionally cult. here, and common in wet grounds farther south. Found rarely on S.I. and L.I. B.B.G., Pros. Pk.

The Rudkin Oak, *Q. Rúdkini* Britton, a hybrid between *Q. marilandica* and *Q. Phellos*; the Britton Oak, *Q. Bríttoni* W.T. Davis, a hybrid between *Q. marilandica* and *Q. ilicifolia*; and the Bartram Oak, *Q. heterophýlla* Michx. f. (B.B.G.), a hybrid between *Q. Phellos* and *Q. borealis maxima*, occur on S.I.

The commonest oaks in the N.Y. region are *Q. borealis*, *Q. alba*, and *Q. velutina*. The first and second prefer the higher, drier locations, while the last is not particular. In swamps and wet soil *Q. palustris* and *Q. bicolor* are common. *Q. montana* is almost entirely restricted to higher elevations and rocky woods, but occurs in low, sandy woods on S.I. *Q. stellata* is found in sterile soil; usually, in this vicinity, not far from the sea coast (common on Hunter's I.), although it occurs as far west as Kan. Except in the low, sandy woods of S.I., *Q. coccinea* is not very common in this neighborhood, but may be looked for in company with *Q. velutina*. *Q. ilicifolia* and *Q. prinoides*, the scrub oaks, as well as *Q. stellata*, are common on L.I. east of the Hempstead Plains.

## URTICACEAE — NETTLE FAMILY

In the mulberry subfamily, including the mulberry, paper mulberry, and Osage orange, the sap is milky.

### ÚLMUS — ELM

Fr. surrounded by a membranous wing; lvs. usually inequilateral at base; buds with about 6 scales exposed, arranged in 2 ranks; true terminal bud absent; stipule scars unequal; bundle scars 3, or in 3 groups.

86. *U. fúlva* Michx. Slippery Elm. Lvs. large, very rough to the touch, ovate-oblong, pointed, doubly serrate, pubescent below, not symmetrical at base; *brts.* gray, pubescent, and rough to the touch, with *mucilaginous taste*; buds, especially the fl. buds, large, with rusty brown hairs, blunt; frs. borne in short-stalked, dense clusters. Occasional in rocky woods. Inw., Kis. Pk., V.C. Pk.

87. *U. americàna* L. American Elm. Lvs. as in slippery elm, but smaller, not so rough to the touch, and smoother below; *brts.* brown, somewhat zig-zag, with elm taste, but not mucilaginous; buds red-brown and fairly smooth, often situated a little at one side of the lf. scar; frs. smaller than in last, borne in long-stalked clusters; a larger tree than the last, with bark more deeply grooved; trunk typically dividing above into several leaders. Common in moist soil, and much planted as a street tree. B. Ter., B.B.G., C. Pk., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

88. *U. campéstris* L. (*U. procèra* Salisb.). English Elm. Similar in a general way to the American elm, but differs mainly as follows: lvs. smaller, and more pubescent below; buds darker or almost black; *brts.* generally downy; bark darker colored, and divided into small, irregular, polygonal plates; tree with a single main trunk, not dividing into a number of leaders. Native of England and western and southern Europe. Often cult. and has several vars. C. Pk., Pros. Pk.

The Wych Elm, *U. glàbra* Huds., from Europe and western Asia, has a light gray bark which stays smooth for a long time, and some of the lvs. 3-lobed at tip. Pros. Pk. The Camperdown Elm, *U. glabra* var. *Camperdownii* Rehd., with pendulous *brts.* and round-topped head, is occasionally cult. Pros. Pk. There are many other cult. vars.

#### CÉLTIS — HACKBERRY

89. *C. occidentàlis* L. Hackberry. Buds small, sharp-pointed, pressed close to brt.; true terminal bud lacking; stipule scars narrow; pith of *brts.* closely chambered, sometimes only at the nodes; *bark warty* (caused by local growths of cork); insect galls usually plentiful on lvs. and twigs, often causing "witches' brooms" on latter; lvs. ovate, long-pointed, serrate, unequal at base, with 3 prominent veins starting from base; fr. a drupe the size of a pea, with thin, sweet, edible flesh, yellow when ripe; a small tree. C. Pk., Inw., Kis. Pk., Pal., Pros. Pk., V.C. Pk.

#### MACLÙRA — OSAGE-ORANGE

90. *M. pomífera* (Raf.) Schneider. Osage-orange. Medium-sized tree with yellow-brown bark; shining, entire lvs.; *axillary, simple thorns*; *milky sap*; and large multiple frs. the size of an orange, mostly falling green; buds small, globular; true terminal bud lacking; stipule scars small.

Native in the Middle West. Cult. and sparingly naturalized in Greater N.Y. Used for hedges. B.B.G., N.Y.B.G., Pel. Pk., Pros. Pk., S.I. nr. Richmond.

#### BROUSSONÈTIA — PAPER MULBERRY

91. *B. papyrifera* (L.) Vent. Paper Mulberry. A medium-sized tree with smooth bark, gray with pinkish tinge, and *milky sap*; *lvs. often opposite*, pubescent below, rough above, and often lobed; lf. scars rounded, elevated; buds mostly covered by 2 striate scales; terminal bud lacking; pith white, with a thin, green partition at each node. From China and Japan. Cult. and sparingly naturalized in Greater N.Y. B.B.G., Pal., Pros. Pk.

#### MORUS — MULBERRY

92. *M. álba* L. White Mulberry. *Lvs. smooth and shining*, often variously lobed; *sap milky*; bark with yellowish tinge; buds red-brown, triangular. Naturalized from China. Several vars. cult. B.B.G., C. Pk., Inw., N.Y.B.G., Pros. Pk.

93. *M. rùbra* L. Red Mulberry. *Lvs. broad, occasionally lobed*, rough and hairy; *sap milky*; bark darker than in last; buds larger, with green tinge. Native species in woods, but rare. C. Pk., Inw., Pal.

### MAGNOLIÀCEAE — MAGNOLIA FAMILY

#### MAGNÒLIA

Buds with only one scale showing, the inner scales (in lf. buds) alternating with the rudimentary lvs.; large true terminal bud; stipule scars linear, encircling brt.; pith sometimes with firmer diaphragms.

Many of the cult. magnolias in Greater N.Y. are Asiatic, and bloom in early spring before the lvs. appear. The species native in the U.S., of which there are eight or nine, bloom after or with the appearance of the lvs., and the fls. are therefore not so conspicuous, although often large.

94. *M. virginiana* L. Sweet Bay. Small tree; lvs. half-evergreen, glaucous beneath; brts. bright green. Grows in one spot on the south shore of L.I., on and near the coast of N.J., and on S.I. B.B.G.

The Cucumber Magnolia, *\*M. acuminata* L., a large, pyramidal forest tree, native in central and western N.Y., with downy buds and u-shaped lf. scars; and the Umbrella Magnolia, *\*M. tripétala* L., a smaller tree (Pa. southward), with large, smooth or glaucous buds, and lvs. up to 20 in. long, are commonly cult. B.B.G., Kis. Pk.

#### LIRIODÉNDRON — TULIP TREE

95. *L. Tulipífera* L. Yellow Poplar (Tulip Tree). A tall, straight forest tree, valuable for its timber; lvs. squarish at apex; *pith white, chambered*; bud shaped like a duck's bill, smooth, covered by two valvate

scales; true terminal bud present; stipule scars encircling brt.; frs. cone-shaped, conspicuous, and long persistent, often throughout the winter. Likes deep, rich soil. B.B.G., C. Pk., Inw., Kis. Pk., N.Y.B.G., Pal., Pros. Pk., V.C. Pk.

## MENISPERMACEAE — MOONSEED FAMILY

### MENISPERMUM — MOONSEED

The Moonseed, \**M. canadense* L., is a woody climber with broad, peltate, lobed or angular, alternate lvs.; and small, black, fleshy frs.; each with one crescent-shaped seed (hence the name); brts. minutely fluted, slender; lf. scars elliptical, raised, and with concave surface; buds very small. B.B.G., Inw., Pal., V.C. Pk.

## BERBERIDACEAE — BARBERRY FAMILY

### BÉRBERIS — BARBERRY

Shrubs with red berries and a spine (modified lf.) at each node.

The two species of barberry commonly seen are the Common Barberry, \**B. vulgaris* L., a native of Europe, but naturalized in woods and fields, with berries in a long cluster, and with usually 3-pronged spines; and the Japanese Barberry, \**B. Thunbergii* DC., much cult. for hedges, with berries borne singly or in umbel-like clusters, and with usually simple spines. B.B.G.

### MAHONIA

The Oregon Grape, \**M. Aquifolium* Nutt., a low shrub with evergreen, pinnate, spiny-margined lvs., and blue-black, glaucous fr., is occasionally cult. B.B.G.

## LAURACEAE — LAUREL FAMILY

### SÁSSAFRAS — SASSAFRAS

96. *S. variifolium* (Salisb.) Ktze. Sassafras. Brts. and buds green, with characteristic taste; internodes conspicuously variable in length; true terminal bud present, large, with about 4 scales exposed; stipule scars lacking; lvs. simple, variously lobed or entire; bark brown, in old trees deeply furrowed into broad, flat ridges, which are sometimes cut by transverse lines; often a large tree, the trunk sometimes nearly 6 ft. in diam. B. Ter., B.B.G., C. Pk., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

### BENZÖIN — SPICE BUSH

97. \**B. aestivale* (L.) Nees. Spice Bush. Brts. with characteristic spicy taste; buds of two kinds: fl. buds larger and globular, lf. buds smaller and pointed, with about 3 scales; on brts. where fl. buds occur, they are arranged in pairs at the nodes, one on each side of a lf. bud; true terminal bud and stipule scars lacking; lvs. simple, obovate. B. Ter., B.B.G., C. Pk., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

## HAMAMELIDACEAE — WITCH-HAZEL FAMILY

## HAMAMÈLIS — WITCH-HAZEL

98. *H. virginiana* L. Witch-hazel. Usually a shrub, but sometimes tree-like; brts. zig-zag; buds naked, stalked, the terminal crescent-shaped, tomentose, flat, the lateral more cylindrical; lvs. oval, wavy-toothed, very one-sided at base; stipule scars unequal; fls. with long, narrow, crinkly, yellow petals, opening in Oct. and Nov.; fr. a 2-chambered capsule, shooting out its 2 seeds in the fall and remaining gaping open on the plant through the winter. Common in many of our woodlands. B.B.G., C. Pk., Inw., N.Y.B.G., Pal., V.C. Pk.

## LIQUIDÁMBAR — SWEET GUM

99. *L. Styraciflua* L. Red Gum (Sweet Gum). Large tree with *star-shaped lvs.*; buds pointed, shining, scaly, and red-brown or greenish; terminal bud large,  $\frac{1}{4}$ – $\frac{1}{2}$  in. long; bud scales with a minute point at tip, and fringed on margin; stipule scars lacking; brs. of second year and older often with corky ridges; brts. often brown above, green beneath; bark light gray and smooth on small trunks and brs.; scaly and light brown on older trunks; fr. a spiny ball, often hanging on the tree through the winter. An important timber tree. This is near the northern limit of its range; grows wild as far north as South Norwalk, Conn., but is common in the southern States. B. Ter., B.B.G., C. Pk., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

## PLATANACEAE — PLANE TREE FAMILY

## PLÁTANUS — PLANE TREE

Outer bark peeling off in thin plates of varying size, revealing whitish or yellowish inner bark; buds conical, covered by a single cap-like scale, and hidden under hollow base of petiole; true terminal bud lacking; stipule scars narrow, encircling brt.; lf. scars encircling bud; lvs. palmately lobed; fr. head a conspicuous ball, made up of many little hard frs., each surrounded by long hairs; large trees, the native species with the most massive trunk of all the deciduous trees in N.A.

100. *P. occidentalis* L. Sycamore. *Inner bark*, where exposed, *white*; *lvs. shallowly 3-5-lobed* (lobes shorter than broad); fr. heads borne singly (rarely in 2's), a little more than 1 in. in diam., and not markedly bristly. Native in woods and fields, usually in moist soil. Easily recognized at a distance by its chalky-white patches of bark. Inw., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

101. *P. orientalis* L. Oriental Plane. *Inner bark* of a greenish white or grayish hue; *lvs. deeply 5-7- (rarely 3-) lobed* (lobes longer than

broad); fr. heads 2-6, bristly, the smallest of the three species, 1 in. or less in diam. Native in western Asia and southeastern Europe. C. Pk., Pros. Pk.

102. *P. acerifolia* Willd. London Plane. A hybrid between *P. occidentalis* and *P. orientalis*, sometimes resembling more the one, and sometimes more the other parent; inner bark of a greenish or yellow hue; lvs. 3-5-lobed, the middle lobe as long as, or slightly longer than broad; lobes not, or only sparingly toothed; lvs. have the general aspect of maple lvs. (hence the specific name); fr. heads usually in 2's (rarely 3's), bristly, about 1 in. in diam. The species commonly planted along streets; seems better adapted to city conditions than any other tree. B.B.G.

## ROSACEAE — ROSE FAMILY

A large family, divided into several tribes, some of which are:

- I. Spiraeas, with dry frs.
- II. Apple tribe, with characteristic fleshy fr. (pome); includes apples, pears, quinces, shadbush, and hawthorns.
- III. Rubus tribe; includes blackberries and raspberries.
- IV. Roses.
- V. Prunus tribe; includes cherries, plums or prunes, peach, nectarine, and almond.

### SPIRAEA TRIBE

#### SPIRAEA

Two species of *Spiraea* are common, native, low shrubs of Greater N.Y.: the Meadow-sweet, °*S. latifolia* Borkh., with lvs., frs., and purplish brts. glabrous, and white or pinkish fls.; and the Hardhack, °*S. tomentosa* L., with lvs., frs., and brts. rusty woolly (hence the specific name), and fls. mostly deep rose-color; true terminal bud lacking. B.B.G. Many other species cult.

### APPLE TRIBE

#### MALUS — APPLE

103. *M. pumila* Mill. (*Pyrus Malus* L.). Wild Apple. Brts. more or less woolly, at least toward tip; buds grayish, hairy at tip, blunt, terminal bud present, much larger than the lateral; stipule scars lacking; bundle scars 3; lvs. oblong-ovate, pubescent beneath. The common "eating apple" of Asiatic origin, and now self-sown throughout the U.S. The Baldwins, Greenings, Pippins, etc., are cult. vars. of this species, and can not be relied on to grow true to seed, but must be grafted. The wild apples coming from chance-sown seed, therefore, usually bear dwarfed, knubbly fr. Inw., Kis. Pk., V.C. Pk.



## PYRUS — PEAR

104. *P. communis* L. Pear. Buds usually glabrous, sharp-pointed; often with thorn-like short brs.; stipule scars lacking; bundle scars 3; *lvs.* elliptic, *smooth beneath*. In the same category as *Malus pumila*, i.e., of Asiatic origin, and long cult., but not so commonly found in a wild state. B. Ter., Pel. Pk.

## ARÒNIA (PYRUS) — CHOKEBERRY

Shrubs of wet places, occasional in drier soil; true terminal buds, with about 5 scales exposed; bundle scars 3; stipule scars lacking. The following, as well as forms intermediate between them, are common on S.I.

105. *°A. arbutifolia* (L.) Pers. Red Chokeberry. A shrub with clusters of small, apple-like frs.; buds carmine, sometimes with greenish tints, long, narrow, and sharp-pointed; *lvs.* elliptic, pubescent beneath, with many rounded teeth, and with glands along midrib on upper side; frs. bright red. B. Ter., B.B.G., Kis. Pk., Pel. Pk. *°Var. atropurpurea* Robinson, the Purple-fruited Chokeberry, has fr. a little larger than that of the type, and very dark red or purple. B. Ter.

106. *°A. melanocarpa* (Michx.) Britton. Black Chokeberry. Similar to last species, but fr. is very dark purple or nearly black, and *lvs.* are *smooth beneath*. B. Ter., Pal.

## SÓRBUS (PYRUS) — MOUNTAIN ASH

Small trees, with clusters of attractive, bright red frs. in the fall, appearing like berries, but in reality like small apples in structure.

107. *S. Aucuparia* L. European Mountain Ash (Rowan Tree). A small tree with pinnate *lvs.* resembling those of ash, but not opposite; *lfts.* blunt, pubescent beneath, at least when young; terminal buds much larger than lateral, pubescent with long, matted hairs; bundle scars 3 or 5; stipule scars lacking. Often cult.

In the American Mountain Ash, *\*S. americana* Marsh., which grows wild in Westchester Co., and is found from there northward in N.Y. State, the *lfts.* are *taper-pointed* and glabrous beneath. *S. hybrida* L., a form in which the *lvs.* are tomentose on the under side, pinnate only toward the base, the upper part being lobed, or sometimes the whole lf. only lobed, is occasionally cult.

## AMELÁNCHIER — JUNE BERRY

Besides the following, other species may be looked for in the Greater N.Y. region, but the *lvs.* and fr. are necessary for their identification. (See Wiegand, *Rhodora* 14: 117 and 239. 1912; also 22: 146. 1920).

108. *A. canadensis* (L.) Medic. Serviceberry (Shadbush). Bark smooth, colored somewhat like that of blue beech; buds like those of chokeberry in shape, narrow and long-pointed, but larger, usually of a green

color; terminal bud much larger than lateral; bud scales sometimes twisted; bundle scars 3; stipule scars lacking; lvs. usually obovate and heart-shaped at base, pointed at tip, 1-3 in. long; fls. white, with oblong or linear petals, in early May; fr. small, purplish, usually tasteless. B. Ter., Inw., Pal., Pros. Pk.

The Southern Swamp Shadbush, *A. oblongifolia* (T. & G.) Roem., has similar buds, but slightly smaller, oblong lvs., usually rounded at both ends; and sweet, nearly black fr.

### CRATAEGUS — HAWTHORN

Small trees or shrubs with thorns in the axils of the lvs., and apple-like frs.; buds rather small, rounded. Several native species grow in Greater N.Y., but they are difficult to distinguish. They can be identified as hawthorns by the axillary thorns. B.B.G.

109. *C. Oxyacantha* L. English Hawthorn. Has small, deeply lobed lvs., and mostly white or pink fls. The "May" tree of English literature. C. Pk., Pros. Pk.

### RUBUS TRIBE

#### RUBUS — BRAMBLE

To this genus belong the raspberries and blackberries. Basal portion of petiole persistent; buds commonly superposed, the lower one covered by the petiole base.

#### RASPBERRIES

The raspberries are either without prickles, or their prickles are weak and bristle-like. The fr. is like a thimble in shape, and when picked, leaves the cone-shaped receptacle on the plant; lvs. usually compound.

The Wineberry, *R. phoenicolasius* Maxim., a native of Japan, with stems and petioles covered with soft, reddish, glandular hairs, a few prickles also on the stems, is occasionally seen in Greater N.Y. B.B.G., Inw.

110. *R. occidentalis* L. Black Raspberry (Black Cap). Has *glaucous*, prickly *stems*, and lvs. white beneath. The common species in this neighborhood. B. Ter., B.B.G., Inw., Pal., V.C. Pk.

111. *R. odoratus* L. Purple Flowering Raspberry. A handsome species, with large, purple fls., *simple, large-lobed lvs.*, and light brown, loose, *shreddy bark*. It has no prickles, but its stems, when young, are covered with glandular hairs. Rather common along the Palisades, opposite Dyckman St., Manhattan, and often cult. B.B.G.

The Dwarf Raspberry, *R. triflorus* Richards., a low, weak species, almost herbaceous, with smooth lvs. and sour frs., grows occasionally in wet places.

#### BLACKBERRIES

The blackberries have (mostly) strong prickles and compound lvs. The fr., when picked, includes the pulpy receptacle.

112. *R. hispida* L. Swamp Dewberry. Creeping, in swamps or wet woods, with prickles pointed backwards; lvs. smooth on both sides, somewhat leathery. B. Ter.

113. *R. villosus* Ait. Dewberry. Creeping, on dry soil, with stronger prickles pointed backwards; lvs. thinner than in the last, and may be slightly soft-hairy below. B. Ter.

Several species of high blackberries are native in Greater N.Y. They are difficult to distinguish when not in fl. and fr. One of the commonest is:

114. *R. Andrewsianus* Blanchard. Andrews' Highbush Blackberry. Distinguished particularly by prickles and glandular hairs on the fl. and fr. stalks, and by lfts. sparingly pubescent above, velvety beneath, green on both sides. B. Ter., Inw., Pal., Pel. Pk., V.C. Pk.

#### ROSE TRIBE

#### RÒSA — ROSE

Shrubs, with stems usually prickly, lvs. usually pinnately compound. Fr. somewhat resembles a little apple externally, but is really a fleshy structure enclosing many little achenes.

115. *R. carolina* L. Swamp Rose. Tall; young brts. with a pair of usually curved prickles at each node; lvs. dull above, finely toothed, paler and often pubescent below. Grows in wet places. Kis. Pk., V.C. Pk.

The Virginia Rose, *R. virginiana* Mill., with more or less hooked prickles, longer than in the last, and smooth, shining lvs., grows in moist places. The Sweet-brier, *R. rubiginosa* L., naturalized from Europe, with strong, hooked prickles, and lvs. resinous beneath and with the odor of green apples when bruised, is occasionally seen in rocky places and pastures. B.B.G.

#### PRUNUS TRIBE

#### PRÙNUS — CHERRY, PLUM, PEACH, ETC.

Trees or shrubs; lvs. simple, mostly toothed; fr. fleshy, with one stone inside; bark and lvs. of all species with a characteristic bitter flavor; buds usually with 4 or more scales exposed; terminal bud usually present, but lacking in the plums; bundle scars 3; stipule scars indistinct.

116. *P. serótina* Ehrh. Black Cherry. Lvs. simple, *thick*, shining, serrate with *incurved teeth*; frs. black, in racemes; buds bright reddish brown, shiny, about 4 scales showing; brts. with bitter taste like that of cherry pits; bark on young trees reddish brown and smooth, on older brs. and young trunks marked with horizontally elongated lenticels, on old trunks covered with small, red-brown scales. One of the commonest trees in the woods of Greater N.Y. B. Ter., B.B.G., C. Pk., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

117. *P. virginiana* L. Choke Cherry. Usually a shrub, sometimes a tree; buds rather large ( $\frac{1}{4}$  in. long), sharp-pointed, paler than in last species, the margins of the scales light gray; taste of bark cherry-like, but different from that of black cherry; *lvs. thin*, sharply serrate, with *teeth pointing outward*; frs. also in racemes, dark red, very puckery, ripening earlier than in *P. serotina*. Not common in Greater N.Y. B.B.G., Pros. Pk.

118. *P. avium* L. Sweet Cherry (Mazzard). Lvs. usually with *rounded*, unequal *teeth*; brts. stout, and of a paler hue than in last two; bark of young trees and brs. somewhat like that of black cherry, but lenticels are larger and more yellowish; frs. in umbel-like clusters. The sweet, dark red cherry of the garden, native in Europe and western Asia, now growing wild over a large part of eastern U.S. B.B.G., Inw., Kis. Pk., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

119. *P. Pérsica* (L.) Stokes. Peach. Lvs. smooth, long, narrow, tapering to a long point; brts. smooth, reddish on upper side, green beneath; buds pubescent; bark somewhat similar to that of cherries. Fr. velvety. Native in China. Often escaped in Greater N.Y. Inw., Pal.

The Pin Cherry (Wild Red Cherry), *\*P. pennsylvanica* L. f., with long, narrow, long-pointed, finely serrate, smooth lvs., and small, translucent, red frs. in umbel-like clusters, is found on nearby N.J. ridges and farther north. The Beach Plum, *\*P. maritima* Wang., a low, spreading shrub with brts. velvety and buds slightly so, lvs. pubescent below, and red or purple frs. with a bloom, in umbel-like clusters, grows on sea beaches of L.I. and S.I. B.B.G.

## LEGUMINOSAE — PULSE FAMILY

Lvs. pinnate, except in *Cercis*; fls. papilionaceous, except in *Gymnocladus* and *Gleditsia*; fr. a legume; *brts. and inner bark with taste of raw beans or peas*; true terminal bud lacking in our genera.

### GYMNÓCLADUS — COFFEE-TREE

120. *\*G. dioicus* (L.) Koch. Coffee-tree. Lvs. bipinnate; fls. regular; brts. stout, very irregular in arrangement and position; pith salmon-colored; buds two or three together, superposed, and deeply sunken in the bark; pods woody and thick, 5 in. or more long, rather persistent. Best known by its bark, which has thin, twisted ridges standing out at an angle from surface of trunk. Native from western N.Y. south and west. Often cult. here. B.B.G., Flushing, Pros. Pk.

### GLEDÍTSIA — HONEY LOCUST

121. *G. triacanthos* L. Honey Locust. Lvs. once or twice pinnate; pods a foot or more long (sometimes less); fls. regular or nearly so; buds superposed, partly sunken in bark, but not so deeply as in coffee-tree;

*thorns*, which are often *branched*, arise above the lf. axils (a thornless var. occurs, var. *inérmis*); brts. swollen at or below lf. scars; bark comparatively smooth, but often with deep, more or less vertical fissures and many branched thorns. Native from Pa. southward and westward. B.B.G., C. Pk., Kis. Pk., Pal.

## CÉRCIS — REDBUD

122. \**C. canadensis* L. Redbud. Lvs. broadly heart-shaped, entire; buds small, blunt, glabrous, purplish, superposed, with 2, or, in the fl. buds, with several scales exposed; lf. scars somewhat raised, with decurrent ridges; bundle scars 3; stipule scars lacking; fls. pink, papilionaceous, borne close to old wood before lvs. appear; small tree. Native from (N.Y.?) N.J. and central Pa. south and west. B.B.G., N.Y.B.G., Pros. Pk.

In the oriental species, *C. chinensis* Bunge, sometimes cult., the lvs. have a very narrow, transparent margin.

## CLADRÁSTIS — YELLOW-WOOD

123. \**C. lutea* (Michx. f.) K. Koch. Yellow-wood. Bark smooth and gray, like that of beech; buds naked, hairy, superposed, several so close together as to appear as a single bud, almost surrounded by lf. scar; stipule scars lacking; lvs. pinnate, petioles much swollen at base; fls. papilionaceous, white, fragrant, in June. Native in southeastern U.S. A rare tree in its wild state; much cult. B.B.G., Pros. Pk.

## SOPHORA

124. *S. japonica* L. Japan Pagoda-tree. Brts. dark green; buds small, reddish-brown-hairy, almost hidden under u- or v-shaped, raised lf. scars; stipule scars minute; lvs. pinnate; fls. very light yellow, papilionaceous, in July and August. Native in China. B.B.G., Pros. Pk.

## AMÓRPHA

The False Indigo, \**A. fruticosa* L., a tall shrub, native from southern Pa. southward and westward, is sometimes escaped from cult. Has pinnate lvs. marked with minute dots, spikes of violet, papilionaceous fls. in May and June, and 1-2-seeded, small, rough pods; buds with 2 or 3 scales exposed, superposed; stipule scars small. B.B.G., Kis. Pk., Richmond, S.I.

## WISTÈRIA — WISTERIA

Twining climbers, with pinnate lvs., and without tendrils or aerial rootlets; fls. blue, purple, or white, in racemes; lf. scars raised, and with horn-like protuberances (at least on long shoots) which seem to be of assistance in climbing. Several species cult. B.B.G.

## ROBÍNIA — LOCUST

125. *R. Pseudoacácia* L. Black Locust. Bark somewhat resembles that of American elm; a pair of stipular spines normally at nodes of brts., but often lacking; buds superposed, hidden under fringed cracks of bark of lf. scar; lvs. pinnate; fls. white, papilionaceous, fragrant, in late May or June; pods 3-4 in. long,  $\frac{1}{2}$  in. wide, thin. Native south and west of N.Y., but thoroughly established here. A thornless form, var. *inermis*, exists; many other vars. cult. B. Ter., B.B.G., C. Pk., Inw., Kis. Pk., Pal., Pel. Pk., V.C. Pk.

The Clammy Locust, *\*R. viscosa* Vent., with sticky, dark red-brown brts., and pink fls., is native in the mountains of N.C. and S.C., and cult.; naturalized at Richmond, S.I. The Bristly Locust, *\*R. hispida* L., with *bristly brts.* and rose-colored or pale purple fls., is a southern shrub, sometimes cult. B.B.G.

## RUTÀCEAE — RUE FAMILY

## PTÉLEA — HOPTREE

126. *P. trifoliata* L. Hoptree (Wafer Ash). A tall shrub or low tree. Lvs. alternate, with 3 lfts., closely resembling those of poison ivy, but the terminal lft. here is larger than the others, and *narrowes gradually toward its usually sessile base* (in poison ivy the terminal lft. is conspicuously stalked); also, the translucent dots characteristic of the lvs. of this family may readily be seen with a lens. Fr. a thin, circular disk composed of the fr. proper in the center surrounded by a circular wing, the whole about the size of a quarter; frs. in dense clusters persisting during the winter; buds very blunt, pubescent, almost surrounded or often covered by the triangular, raised lf. scars; true terminal bud and stipule scars lacking. Fr. has been used as a substitute for hops. Perhaps native in Greater N.Y.; ranges mostly southward and westward. B.B.G., C. Pk., Kis. Pk., Pros. Pk.

## PHELLODÉNDRON

The Amur Cork Tree, *P. amurénse* Rupr., with *opposite*, pinnate lvs., keeled, silky-pubescent buds, and soft, corky, light gray bark, deeply grooved, is a native of China, and rarely naturalized in Greater N.Y. True terminal bud rarely present; lf. scars horseshoe-shaped, almost surrounding buds; pith brownish; clusters of black frs. persistent during the winter; brts., except for their opposite lvs., similar in appearance to those of poison sumac. B.B.G., N.Y.B.G.

## SIMAROUBACEAE — QUASSIA FAMILY

## AILÁNTHUS

(Ai pronounced like "a" in paper)

127. *A. altissima* (Mill.) Swingle (*A. glandulosa* Desf.). Ailanthus (Tree of Heaven). Brts. thick (extremely so on young shoots), with a

wide, brownish pith; lf. scars large, heart-shaped or shield-shaped; buds hemispherical, more or less pubescent, relatively small, with 2 or sometimes 4 scales exposed, the terminal bud lacking; lvs. pinnate ( $1\frac{1}{2}$ –2 ft. long), with a few blunt, glandular teeth at the base of each lft., and with a rank odor when crushed; *sap not milky*. A native of China, extensively naturalized in Greater N.Y.; remarkably tolerant of city conditions, growing vigorously in the most densely populated sections of the City. B.B.G., C. Pk., Inw., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

## ANACARDIACEAE — CASHEW FAMILY

### RHUS — SUMAC

(Pronounced "shoomac" or "soomac")

Sap milky (except in *R. copallina* and *R. Vernix*); lvs. pinnate (except in *R. Toxicodendron*); lfsts. serrate or entire; stipule scars lacking. In this region, the poisonous species of *Rhus* have whitish fr.; harmless, red. The first, third, and fourth species, although usually shrubs, sometimes attain the size and habit of small trees.

128. *R. typhina* L. Staghorn Sumac. *Young brts. brown-hairy*, somewhat resembling stags' horns; buds almost surrounded by lf. scars; true terminal bud lacking; lfsts. serrate; fr. red. B.B.G., Inw., Pal., V.C. Pk.

129. *R. glabra* L. Smooth Sumac. *Brts. smooth*, usually glaucous; true terminal bud lacking; lfsts. serrate; fr. red. Inw., Kis. Pk., Pal., Pel. Pk., V.C. Pk.

130. *R. copallina* L. Dwarf Sumac. *Brts. downy*; true terminal bud lacking; *lvs. with winged rachis*, lfsts. mostly entire; sap watery; fr. red. B. Ter., Pel. Pk.

131. *R. Vernix* L. Poison Sumac (Poison Dogwood). *Brts. smooth*, speckled with dark dots (lentils); true terminal bud present; *lfsts. entire*; fr. whitish; grows only in wet places. Very poisonous to the touch. B. Ter., B.B.G. (labeled specimen), Kis. Pk., V.C. Pk.

132. *R. Toxicodendron* L. Poison Ivy (Poison Oak). A woody climber with aerial rootlets, but often creeping on the ground and sending up short, erect shoots; buds stalked; fr. whitish; lfsts. 3, entire or toothed, with stalks. Poisonous to the touch. Cf. *Ptelea*, No. 126. *Staphylea*, No. 137, also has 3 lfsts., but there the buds are opposite. B. Ter., B.B.G. (labeled specimen), N.Y.B.G., Pal., Pel. Pk., V.C. Pk.

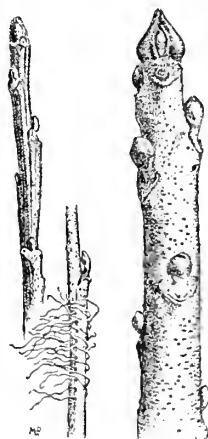


FIG. 2. Branchlets of poison ivy (left) and poison sumac (right). See description in text.

## AQUIFOLIACEAE — HOLLY FAMILY

## ILEX — HOLLY

133. *I. opàca* Ait. Holly. Lvs. persistent, spiny, not so glossy nor with such wavy margins as in English holly (*I. Aquifòlium* L.); *berries red*. Rarely found on L.I. south of the moraine and also on S.I.; common southward not far from the coast; the holly commonly used here for Christmas decoration. B.B.G., C. Pk.

134. *°I. verticillàta* (L.) Gray. Winterberry. Lvs. deciduous, serrate, not spiny; *berries red* and much the same as in holly; brts. slender, dark purple or grayish purple; buds tiny, blunt, superposed, a small one very close to the base of a larger one; lf. scars crescent-shaped, with one vascular bundle scar; true terminal bud and minute stipule scars present. Also popular for decoration, and becoming scarce; moist soil or swamps. B. Ter., B.B.G., Kis. Pk., V.C. Pk.

The Inkberry, *°I. glàbra* (L.) Gray, with smooth, shining, evergreen or half-evergreen lvs., almost entire, and *black fr.*, grows along the south coast of L.I. B.B.G. The Japanese Holly, *°I. crenàta* Thunb., with small, shining, toothed, evergreen lvs., borne very thickly, and *black fr.*, is much cult. and thrives under city conditions. B.B.G.

## CELASTRACEAE — STAFF TREE FAMILY

## EVONYMUS — SPINDLE TREE

135. *E. europàeus* L. European Spindle Tree. Often cult. and sometimes escaped. Opposite, simple, crenate lvs.; tiny, conical buds; slender, *green brts.* with corky lines on the angles; fr. 4-lobed, smooth, pink, with red inner parts disclosed when ripe. B.B.G.

The Strawberry Bush, *°E. americànus* L., with warty fr., grows on S.I. and has been recorded from L.I.

## CELÁSTRUS — STAFF TREE

136. *°°C. scàndens* L. Climbing Bittersweet. A woody *stem twiner*, with orange-colored, berry-like fr., showing scarlet interior when ripe; lvs. simple, finely serrate, alternate; buds small, projecting at right angles to stem. N.Y.B.G., Pros. Pk.

## STAPHYLEACEAE — BLADDERNUT FAMILY

## STAPHYLÈA — BLADDERNUT

137. *°S. trifòlia* L. Bladdernut. Bark striped; buds opposite, with 3 or 4 scales showing, smooth, red-brown, pointed; lf. scars triangular, with 3–5 bundle scars; stipule scars present; terminal bud absent; lvs. with 3 finely serrate lfts.; fr. a 3-divided bladdery pod. Palisades below Englewood Heights. B.B.G.



## ACERACEAE — MAPLE FAMILY

## ACER — MAPLE

Lvs. in our species simple (pinnately compound in *A. Negundo*), palmately lobed, opposite; true terminal bud present, except in *A. palmatum* and *japonicum*; lf. scars triangular or u-shaped or linear; bundle scars in 3 groups; stipule scars lacking; fr. a double samara.

138. *A. saccharum* Marsh. Sugar Maple. Bark not scaly, in old trees in long, thick, irregular plates; buds sharp-pointed and scaly, about  $\frac{1}{4}$  in. long, brown or often purplish, somewhat pubescent, especially toward tip; lvs. with rounded sinuses and sparingly toothed, pale beneath. B.B.G., Inw., N.Y.B.G., Pal., V.C. Pk.

139. *A. platanoides* L. Norway Maple. Bark close (not scaly); buds large, reddish (sometimes intermixed with green); sap milky; lvs. like those of sugar maple, but green and shining beneath. B.B.G., C. Pk., Kis. Pk., N.Y.B.G., Pros. Pk. A red-leaved var. commonly cult. is var. *Schwedleri*. The red color disappears in late June. B.B.G.

140. *A. saccharinum* L. Silver Maple. Bark scaly; buds small, red; lvs. deeply cleft, silvery white beneath, with sharp sinuses. Brts. have a rank odor when crushed, and tend to point upward at their tips. B.B.G., N.Y.B.G., Pal., Pros. Pk.

141. *A. rubrum* L. Red Maple. Bark scaly, much like that of the last, but on young trees and brs. pale as in the beech; buds similar to those of last species; lvs. not so deeply cleft, but also with sharp sinuses, glaucous beneath. The species commonly found wild in Greater N.Y. B. Ter., B.B.G., C. Pk., Inw., Kis. Pk., N.Y.B.G., Pal., Pros. Pk., V.C. Pk.

142. *A. pseudoplatanus* L. Sycamore Maple. Bark in roundish, irregular scales; buds green, sometimes tinged with red; lvs. with sharp sinuses; lf. veins prominent on lower surface and pubescent; fls. and frs. in long pendent clusters. Native in Europe and western Asia. B.B.G., C. Pk., Kis. Pk., N.Y.B.G., Pros. Pk.

143. *A. campêtre* L. Hedge Maple (European Field Maple). Bark close; sap milky; lobes and teeth of lvs. rounded. B.B.G., Pros. Pk.

144. *A. Negundo* L. Boxelder. Buds short-stalked, reddish and usually woolly; lf. scars v-shaped; brts. green or reddish; lvs. compound, with usually 3–5 lfts.; fr. in long (6 in.), pendulous clusters. Native in New England and southward and westward. Kis. Pk., N.Y.B.G., Pros. Pk., S.I. nr. Richmond.

Two small Japanese maples are commonly cult. (some of their vars. shrubby): the Japanese Maple, *A. palmatum* Thunb., with lvs. very deeply palmately 5–9-lobed; and the Fullmoon Maple, *A. japonicum* Thunb., with lvs. not deeply 7–11-lobed. B.B.G., Kis. Pk. Two other small maples are found on the nearby N.J. ridges and on the Hudson Highlands: the Striped Maple (Moosewood), *\*A. pennsylvanicum* L.,

with smooth, green, white-striped bark, 3-lobed, finely toothed lvs., and red buds covered by 2 valvate scales, the terminal bud stalked and large; and the Mountain Maple, \**A. spicatum* Lam., with thin, red-brown bark and downy brts., 3-5-lobed, coarsely serrate lvs., and small buds with only 2 scales showing, the terminal bud  $\frac{1}{8}$  in. long.

## HIPPOCASTANACEAE — HORSE-CHESTNUT FAMILY

### AESCULUS — HORSE-CHESTNUT

145. *A. Hippocastanum* L. Horse-chestnut. Buds resinous, opposite; lvs. opposite, palmately compound, with usually 7 lfts. Native in the Balkan Peninsula. B.B.G., C. Pk., Kis. Pk., Pros. Pk., V.C. Pk.

Large, pink- or red-flowered horse-chestnuts, often cult., are usually *A. carnea* Hayne, with slightly resinous buds and 5 lfts., a cross between *A. Hippocastanum* and *A. Pavia* L., the latter a shrubby, red-flowered species of the southeastern U.S. Kis. Pk. The Ohio Buckeye, \**A. glabra* Willd., a native of the Middle West, sometimes cult. here, has non-resinous buds and usually 5 lfts. B.B.G., Pros. Pk.

## RHAMNACEAE—BUCKTHORN FAMILY

### CEANOTHUS—RED-ROOT

New Jersey Tea, \**C. americanus* L., grows up to 3 ft. tall, and has small hairy buds; lvs. alternate, ovate, smooth or slightly pubescent below, acute at tip, shallowly toothed, with 3 prominent nerves and small deciduous stipules. B.B.G., Pal.

## VITACEAE — VINE FAMILY

### PARTHENOCISSUS

146. \**P. quinquefolia* Planch. (*Psédera quinquefolia* (L.) Greene). Virginia Creeper. Sometimes mistaken for poison ivy, but can be distinguished by its palmately compound lvs. of 5 lfts.; bluish black berries; circular, raised lf. scars subtending blunt buds (often 2 at a node, 1 large and 1 small); and by its usual lack of aerial rootlets, the branched tendrils with expanded adhesive disks at their tips serving as holdfasts (older stems sometimes develop aerial roots in abundance); pith white or greenish. B. Ter., B.B.G., Inw., Pal., Pel. Pk., V.C. Pk.

### VITIS — GRAPE

Lvs. simple, usually lobed; pith brown; stems striate; tendrils unbranched, without disks at their tips.

Two species of wild grape are common in this neighborhood. The Northern Fox Grape, \**V. labrusca* L., has very woolly brts.; lvs. persistently woolly below; a tendril or a fl. cluster at every node; and large, dark purple or amber-colored frs.; has given rise to the Concord and many other vars. of cult. grapes. Pel. Pk., V.C. Pk. The Summer Grape, \**V. aestivalis* Michx., has more loosely pubescent brts.; mature lvs. with scattered rusty wooliness below; tendrils intermittent; and smaller black frs. with a bloom. B.B.G.

## TILIACEAE — LINDEN FAMILY

## TÍLIA — LINDEN

Stalk of fl.- or fr.-cluster appears to grow from about the middle of a large strap-shaped bract; fr. hard, spherical, about the size of a pea; lvs. alternate, more or less heart-shaped; buds lopsided, 2 scales exposed; true terminal bud lacking; stipule scars unequal.

147. *T. americana* L. Basswood. Lvs. heart-shaped, the under surface with tufts of hairs in axils of lateral veins but wanting in those at base of lf.; buds carmine or greenish, with a large scale on one side, giving a lopsided appearance. B.B.G., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

A common European species much cult. is the Common Linden, *T. vulgaris* Hayne, with smaller lvs., which have *tufts of hairs in axils of all the veins*. Kis. Pk., Pel. Pk., Pros. Pk. The Silver Linden of southeastern Europe and western Asia, *T. tomentosa* Moench., occasionally cult., is easily recognized by the white tomentose under surface of the lvs. B.B.G., Pros. Pk.

## CORNACEAE — DOGWOOD FAMILY

*Lvs. opposite* (alternate in *C. alternifolia* and in *Nyssa*), *entire*; fls. small, in rather close bunches (cymes or heads); lf. buds narrow, with a pair of nearly or quite valvate scales.

## CÓRNUS — DOGWOOD

148. *C. florida* L. Dogwood. Small tree; bark appearing like alligator skin; lvs. pale beneath; fr. a bright red drupe; fl. buds globular, lf. buds narrow. The only native species of this region in which the bud scales of the fl. buds grow out into large petal-like bracts at the time of flowering. Very common. C. Pk., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

149. °*C. Amomum* Mill. Kinnikinnik (Silky Dogwood). Lvs. silky, downy, and often rusty beneath; brs. red, *pith tawny* (this shows best in stems 3 years old or more); fr. pale blue. Wet places; very common. B.B.G., V.C. Pk.

150. °*C. stolonifera* Michx. Red-osier Dogwood. Brs. red, with *white pith* at all ages; lvs. whitish beneath, pubescent on both surfaces; fr. white or lead color; stems (stolons) when they touch the soil root easily, making new plants. Wet places; not so common in Greater N.Y. as last species; distinguished from last by *stolons*, *white fr.*, and *white pith*. Pel. Pk., V.C. Pk.

151. °*C. paniculata* L'Her. Panicked Dogwood (Gray Dogwood). Common, and often in drier soil, along fences, etc. Fls. in somewhat convex or elongated clusters, not flat-topped as in three preceding species;

*brts. gray or reddish gray*; pith brown; fr. white, on red stalks; lvs. glaucous below. Pel. Pk., V.C. Pk.

152. *C. mas* L. Cornelian Cherry. *Yellow fls.* blooming early in April, enclosed in the winter bud stage by 4 scales which, however, do not expand at flowering time as in *C. florida*, and are early deciduous. A species from Europe and western Asia, commonly cult. B.B.G.

The Blue Dogwood (Alternate-leaved Dogwood), *C. alternifolia* L. f., a small tree with *alternate lvs.* appressed-pubescent below, occurs on L.I. B.B.G. The Round-leaf Dogwood, \**C. circinata* L'Her. (*C. rugosa* Lam.), with large, almost round lvs., woolly beneath, and green or pinkish purple brts., grows in rocky places to the northward and westward. B.B.G. The Bunchberry, \**C. canadensis* L., is an herbaceous species common in northern and western N.Y. and in New England.

### NÝSSA — TUPELO

153. *N. sylvática* Marsh. Black Gum (Tupelo, Pepperidge, Sour Gum). Large tree; in wet places; the many short, wide-angled brs. remind one of a pear or a hawthorn. Lvs. alternate, simple, turning crimson in fall; pith unequally chambered, the chambers stuffed; lf. scars reddish, with 3 very distinct vascular bundle scars in a straight or curved row; stipule scars lacking; fr. small, a dark blue drupe; buds smooth, ovoid, dark red-brown; true terminal bud present, about 4 scales exposed. B. Ter., B.B.G., C. Pk., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

### ERICACEAE — HEATH FAMILY

A large family, including huckleberries, blueberries, cranberries, mountain laurel, rhododendron, azalea, trailing arbutus, etc. In most of the genera the anthers open by a pore at the tip. Lvs. simple, often evergreen; corolla usually gamopetalous (petals distinct in *Clethra*).

### CLÈTHRA — WHITE ALDER

154. \**C. alnifolia* L. Sweet Pepperbush. A tall shrub with long, erect spikes of white, fragrant fls. in July or August, and dry frs.; buds minutely pubescent; terminal buds pointed, lateral buds very small and inconspicuous or developing into short brts. the same season; brts. downy or scurfy, angled; outer bark peeling off the second year; lf. scar oval or triangular, with bundle scar forming a prominent semicircular or broad u-shaped ridge; lvs. obovate, pointed, smooth, serrate. In wet ground or swamps; also cult. B. Ter., B.B.G., Kis. Pk., N.Y.B.G., Pros. Pk.

### RHODODÉNDRON

Often has a number of brs. growing out in whorl-like fashion at end of previous year's growth. Fl. buds much larger than lf. buds; true terminal bud present. By some authorities the two following species are

classed as azaleas, on account of their deciduous lvs.; true rhododendrons, according to them, have evergreen lvs.

155. *°R. viscosum* (L.) Torr. Clammy Azalea (White Swamp Honeysuckle). Lvs. deciduous, shining, somewhat narrowed toward their bases, often arranged in a conspicuous, flat mosaic near tip of brt.; brts. *bristly*; fl. buds large, with ciliate scales, terminal; lf. buds much smaller; fls. (in June and July) white, fragrant, sticky. *Grows in swamps*. B. Ter., B.B.G., N.Y.B.G.

156. *°R. nudiflorum* (L.) Torr. Purple Azalea (Pinxter Flower). Much like the last, but usually not so tall; with duller lvs. and generally smoother brts.; fls. opening much earlier, with the unfolding of the lvs.; usually of various shades of pink; buds as in the last. *Grows in drier soil*. From the winter characters alone, this and the last species are difficult to distinguish. B. Ter., B.B.G., Pal., Pros. Pk., V.C. Pk.

Various species and vars. of *°Rhododendron* with large, thick, *evergreen lvs.*, are cult.

#### KÁLMIA — LAUREL

Smooth shrubs with showy fls., evergreen lvs., and small buds with only 2 scales showing.

157. *K. latifolia* L. Mountain Laurel. Has ovate, thick, leathery, *alternate lvs.* Fls. terminal. B.B.G.

158. *°K. angustifolia* L. Sheep Laurel. A small shrub with smaller, thinner, oblong *lvs.*, which are *opposite or in 3's* (rarely in 4's). Fls. lateral. Poisonous to stock; sometimes called lambkill. B. Ter., B.B.G.

#### LEUCÓTHOË — FETTER BUSH

The Fetter Bush, *°L. racemosa* (L.) Gray, is a shrub with thin, deciduous, alternate, toothed lvs., and very fragrant, white fls. in one-sided, terminal racemes; in winter the roundish dry frs. are still to be seen, as well as the racemes of fl. buds for the next year; the brts. are often reddish brown above, green below; buds small, roundish; lf. scars crescent-shaped or semicircular, with one central bundle scar; true terminal bud lacking. Poisonous to stock. Native on S.I. B. Ter., B.B.G.

#### LYÒNIA

The Stagger-bush, *°L. mariàna* (L.) D. Don., has small, roundish, crimson buds standing out at a wide angle from the smooth, yellow brts., and urn-shaped, persistent, dry frs.; buds with at least 4 scales exposed; true terminal bud lacking. Poisonous to stock. B. Ter.

159. *°L. ligustrina* (L.) DC. Male Berry. Has one-sided racemes of small, white fls., and roundish, dry frs.; brts. often minutely pubescent, yellow; buds smooth, slender, sharp-pointed, crimson, with 2 scales showing, flattened, lying close to brt.; true terminal bud lacking; lf. scars shield-shaped; lvs. oval, pointed, mostly smooth. B. Ter.

## GAULTHERIA—AROMATIC WINTERGREEN

The Aromatic Wintergreen, or Teaberry, or Checkerberry, °*G. procumbens* L., has slender stems creeping on the ground or just below; flowering brs. upright, simple, or branched very little, 2–6 in. tall, with alternate evergreen lvs. crowded at the tip; lvs. with short petioles, oval or obovate, obscurely serrate, smooth and shining; lvs. and bright red “berries” with characteristic wintergreen flavor. B. Ter., B.B.G.

## GAYLUSSÀCIA — HUCKLEBERRY

Fr. sweet, with ten large seeds; lvs. (in our species) more or less dotted on the under surface with resin globules; true terminal bud lacking.

160. °*G. baccata* (Wang.) K. Koch. Black Huckleberry. Stems stiff, much branched, finely pubescent on younger parts; lvs. densely covered on under side with shiny resin globules which are sticky when young; fl. buds larger than lf. buds, with resin globules; fr. black, shiny, edible, in short, dense clusters. Fls. more slender than those of blueberries, and more reddish. The common species in Greater N.Y. B. Ter., B.B.G.

The Dwarf Huckleberry, °*G. dumosa* (Andr.) T. & G., has glandular-hairy brs. coming up from a creeping stem, shiny lvs., glandular-pubescent below, and elongated clusters of black, tasteless frs. The Dangleberry, °*G. frondosa* (L.) T. & G., has slender, smooth, *glaucous stems, lvs. glaucous* and finely pubescent beneath, and dark blue, edible frs. with a white bloom. B. Ter., B.B.G.

## VACCINIUM — BLUEBERRY, CRANBERRY

Fr. usually more acid than that of huckleberries, and with numerous small seeds; true terminal bud lacking.

The Deerberry, °*V. stamineum* L., is low and much branched, with bitter-tasting, pubescent stems; pale lvs., glaucous and pubescent below; fls. with projecting stamens; and greenish, glaucous, tart fr. B. Ter., Pal.

161. °*V. pennsylvanicum* Lam. Early Sweet Blueberry. Low; stems smooth; lvs. smooth, shining, *green on both sides*, not mucronate; fr. mostly bluish black and glaucous. B.B.G.

162. °*V. vacillans* Kalm. Late Low Blueberry. Low; stems smooth and yellowish green; lvs. dull above, glaucous below, *mucronate*; fr. blue, glaucous, later than in the last species. Inw., Pal., V.C. Pk.

163. °*V. corymbosum* L. High or Swamp Blueberry. Tall; brts. green or often reddish; fl. buds red, plump, pointed; lf. buds (smaller than fl. buds) pointed, the scales each with a prominent, spine-like point; lf. scars very narrow, sometimes merely transverse lines on brt.; lvs. usually somewhat pubescent below; fr. blue-black, glaucous. Very common. B. Ter., B.B.G., Kis. Pk., V.C. Pk.

The Black High Blueberry, °*V. atrococcum* (Gray) Heller, is somewhat similar to the last, but has lvs. densely pubescent below and *black, shiny fr.*; blooms and frs. earlier. B.B.G. The American Cranberry, °*V. macrocarpon* Ait., evergreen, with sour, red frs., grows on L.I. and is said to occur on S.I. B.B.G.

## EBENACEAE — EBONY FAMILY

## DIOSPÏROS — PERSIMMON

164. *D. virginiana* L. Persimmon. A tree with alternate, ovate-oblong, entire, smooth lvs.; yellowish, fleshy frs. an in. or slightly less in diam., very puckery; somewhat triangular buds with only 2 or 3 greatly overlapping scales showing; bark deeply cut into thick, squarish segments; terminal bud and stipule scars lacking; pith irregularly chambered, the chambers often stuffed. B.B.G., Kis. Pk., N.Y.B.G., Pel. Pk.

## OLEACEAE — OLIVE FAMILY

## FRÁXINUS — ASH

Lvs. pinnately compound; true terminal bud present; fr. a samara or key; lf. scars crescent-shaped to almost circular; bundle scars numerous in a crescent- or c-shaped aggregate. The ash is sometimes confused with the hickory, but can readily be distinguished by its opposite lvs. and buds (alternate in hickory).

165. *F. americana* L. White Ash. Buds stout, rusty to dark brown or sometimes nearly black; usually a pair of lateral buds very close to the base of the terminal one; *lf. scars crescent-shaped*; bark close but grooved as in mockernut; lf. stalked, may or may not be pubescent beneath; brts. smooth and shining, usually gray or greenish brown. The common species. B.B.G., C. Pk., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

166. *F. pennsylvanica* Marsh. Red Ash. Buds smaller than in white ash, rusty brown; *lf. scars semicircular*, not or only a little concave on upper margin; lf. stalked; *lvs. and ends of brts. downy*; smaller tree, with more slender brts. and more irregular in habit, but with bark like that of the last. Grows in moist soil. B.B.G., Inw., V.C. Pk.

167. *F. nigra* Marsh. Black Ash. Buds usually black and rather sharp-pointed, the first pair of lateral buds at a little distance below the terminal bud, giving it a stalked appearance; brts. stout, *yellow* or buff-colored, not shining but smooth; lf. scars circular to semicircular; large trees with corky bark which easily rubs off; *lf. sessile*. In swamps. Kis. Pk., V.C. Pk.

168. *F. excelsior* L. European Ash. Has jet-black buds, with a pair just below the terminal bud, as in white ash; lf. scars semicircular; lf. almost sessile, serrate. Commonly planted in parks.

The Golden Bell, °*Forsythia*, from Asia (B.B.G.); the Common Lilac, °*Syringa*, from Europe (B.B.G.); and the Privet, °*Ligustrum*, from Europe (B.B.G.), commonly used for hedges, also belong to this family, and all have opposite leaves.

## SOLANACEAE — NIGHTSHADE FAMILY

## SOLANUM — NIGHTSHADE

169. <sup>oo</sup>S. *Dulcamàra* L. Bitter Nightshade or Bittersweet. A woody climber naturalized in some places, with clusters of bright red berries said to be poisonous. Lvs. simple, ovate or heart-shaped, or with two ear-like lobes at the base which often become separate lfts.; stems light gray with an olive tint, usually somewhat downy, terete or irregularly 3-sided; buds globose, alternate; lf. scars raised, semicircular. Not a relative of the true bittersweet. Native in Europe and Asia. B.B.G., C. Pk., Kis. Pk.

## SCROPHULARIACEAE — FIGWORT FAMILY

## PAULOWNIA

170. *P. tomentosa* Steud. Royal Paulownia. Lvs. opposite, heart-shaped, soft-pubescent, often showing very shallow lobing, indicated by projecting points on the margins; large, violet, unequally 5-lobed fls. in upright panicles in May; clusters of large, ovoid capsules to be seen in winter, as well as clusters of fl. buds for the following year; seeds small, winged; lf. buds blunt, sunken in bark, superposed above large, nearly circular lf. scars; terminal bud lacking; pith usually chambered, white. A Chinese species escaped in the U.S., from southern N.Y. to Fla. and Tex. B.B.G., Inw. (River Rd.), N.Y.B.G., Pal., B'way at V.C. Pk.

## BIGNONIACEAE — BIGNONIA FAMILY

## TÉCOMA — TRUMPET CREEPER

The Trumpet-creeper, <sup>\*\*</sup>*T. radicans* (L.) Juss. (*Cámpsis radicans* Seem.), is a vine with opposite, deciduous, pinnately compound lvs., and conspicuous, orange-scarlet, tubular fls., climbing mainly by aerial rootlets arising at the nodes. Lf. scars elliptical or shield-shaped; buds with 1-3 pairs of scales exposed. Native in N.J. and Pa. and southward and westward. Cult.

## CATÁLPA — CATALPA

Apt to be confused with paulownia, but has *lvs. usually 3 at a node* (sometimes opposite), smoother, without a tendency toward lobing, and with *solitary buds* in their axils; nearly white, spotted fls., opening later than in paulownia; very *long, nearly cylindrical pods*, with large, winged seeds.

171. <sup>\*</sup>*C. speciosa* Warder. Hardy Catalpa. Fls. (in June) *inconspicuously spotted*; lvs. long-pointed, without odor when crushed; fr. 8-20 in. long,  $\frac{1}{2}$ - $\frac{3}{4}$  in. in diam. at the middle; *wings of seeds rounded* at end, with a fringe of short hairs. Native in the Middle West. B.B.G., Pel. Pk.



172. *C. bigonioides* Walt. Common Catalpa. Fls. (in June and July) *conspicuously spotted*; lvs. short-pointed, with unpleasant odor when crushed; fr. 6-20 in. long,  $\frac{1}{4}$ - $\frac{1}{3}$  in. in diam. at the middle; wings of seeds pointed at end, with a fringe of long hairs. Native in the southern States. B.B.G.

## RUBIACEAE — MADDER FAMILY

### CEPHALÁNTHUS — BUTTONBUSH

The Buttonbush, *C. occidentalis* L., usually a shrub, with ovate, entire lvs., opposite or in 3's, with triangular stipules; small buds in depressed areas above the circular lf. scars; white fls. in July and August in dense, round heads, and small, dry, persistent frs. clustered the same way; grows in swampy places. B. Ter., B.B.G., Kis. Pk., V.C. Pk.

## CAPRIFOLIACEAE — HONEYSUCKLE FAMILY

Entire family has opposite lvs. (and buds).

### DIERVÍLLA — BUSH HONEYSUCKLE

The Dwarf Bush Honeysuckle, *D. Lonicera* Mill., has oblong-ovate, pointed, serrate, ciliate lvs.; yellow to red fls. ripening into slender, long-pointed, persistent, dry frs.; pointed, scaly buds; terminal bud present; stipule scars lacking.

### LONICÈRA — HONEYSUCKLE

173. *L. japónica* Thunb. Japanese Honeysuckle. The common species, a usually pubescent climber and creeper; very variable; lvs. ovate or oblong, half-evergreen, sometimes lobed; fr. black; grows wild in abundance in many parts of our woods and thickets, especially on L.I. B.B.G., C. Pk., For. Pk., Inw., Kis. Pk., Pal.

The Trumpet Honeysuckle, *L. sempervirens* L., a smooth, more or less evergreen climber with red fr., is said to occur on L.I. and S.I.

### VIBÚRNUM — ARROW-WOOD

Likely to be confused with *Cornus*, because of the opposite, simple lvs. and somewhat similar-appearing, white fls.; but the lvs. are serrate, while in *Cornus* they are entire. Fr. (in our species) black or very dark blue; true terminal bud present; stipule scars lacking; lf. scars not quite meeting at sides (sometimes joined by a transverse ridge); buds covered by 2 valvate or 2 or 3 pairs of scales.

174. *V. acerifolium* L. Maple-leaf Viburnum. A low shrub; lvs. pubescent, toothed, shaped like those of red maple, with minute dark dots on the under side; bud scales separate, i.e., not valvate, the outermost pair very short. Very common in woods. Inw., Pal., V.C. Pk.

175. *V. dentatum* L. Arrow-wood. Lvs. with coarse teeth, nearly smooth beneath; bud scales separate, the outermost pair longer than in

the last species, often reaching the middle of the bud. In wet places. B. Ter., B.B.G., Kis. Pk., Pal., Pel. Pk., V.C. Pk.

The Downy Arrow-wood, \**V. pubescens* (Ait.) Pursh, which closely resembles *V. dentatum*, grows on higher, drier ground, and has lvs. pubescent beneath. Found sparingly along the Palisades opposite Dyckman Street. The Nannyberry, *V. Lentago* L., has upper lvs. very long-pointed, on winged petioles, valvate bud scales, and long, limber brs. B.B.G.

176. *V. prunifolium* L. Blackhaw. Shrub or small tree with short, stiff brs.; bark somewhat like that of *Cornus florida*; lvs. oval, finely serrate, on only slightly winged petioles; bud scales valvate or grown together. C. Pk., B.B.G., Inw., Kis. Pk., Pal., Pel. Pk., V.C. Pk.

#### SAMBUCUS — ELDER

Lvs. pinnate; pith wide and soft; true terminal bud lacking; stipule scars lacking; lf. scars meeting laterally, or connected by transverse lines.

177. \**S. canadensis* L. Common Elder. *Pith white*; fls. and frs. in flat-topped clusters. The common species, with black berries. B. Ter., B.B.G., Inw., Kis. Pk., N.Y.B.G., Pal., Pel. Pk., Pros. Pk., V.C. Pk.

178. \**S. pubens* Michx. (*S. racemosa* L. of Gray's Manual). Red-berried Elder. *Pith orange*; buds and young brts. often with purplish tinge; fls. and frs. in elongated clusters; berries red. Likes rocky woods. Pal., Inw.

#### COMPÓSITAE — COMPOSITE FAMILY

Two species of this family are shrubby and of common occurrence in the salt marshes of Greater New York.

#### BÁCCHARIS — GROUNDSEL-TREE

The Groundsel-tree, *B. halimifolia* L., sometimes attains the dimensions of a tree, and is distinguished by its alternate, obovate, simple lvs., bluntly toothed in the upper part (upper lvs. entire); slender, green or brownish, ridged brts. with minute, resinous buds, and broadly v-shaped lf. scars. Stipule scars absent. Since the brts. have indeterminate growth, a typical terminal lf. bud is lacking. Fls. in dense terminal panicles; dioecious, the pistillate plants conspicuous in the late fall with their tassels of white pappus.

#### ÎVA — MARSH-ELDER

The Marsh-elder, \**I. oraria* Bartlett, is lower (2-4 ft.), has longer, oval or lanceolate, somewhat fleshy, *sharply toothed*, mostly *opposite lvs.*, ridged brts., and fls. resembling those of the ragweed. Lf. scars broadly triangular, and when opposite, connected by lateral flaps. Stipule scars absent.

## GLOSSARY

- Accessory buds.* Buds near the nodes but not in the leaf axils.
- Achene.* A small, dry, one-seeded, indehiscent fruit.
- Acicular.* Needle-shaped.
- Acute.* Sharp-pointed.
- Alternate.* Not opposite; (leaves) only one at a node; (buds) only a single axillary bud at a node.
- Aril.* A fleshy outgrowth from a seed, sometimes more or less surrounding it.
- Awl-shaped.* Tapering from a thick base to a sharp point.
- Axil.* Angle; e.g., the angle between a leaf and stem, or the angle of a branching vein.
- Axillary.* Situated in an axil.
- Axis.* The center line of any organ, or the central organ around which others are attached.
- Berry.* A many-seeded, entirely fleshy fruit.
- Blade.* The expanded part of a leaf.
- Bract.* A small leaf or scale in the axil of which a flower or flower cluster may be borne.
- Branch.* A subdivision of the main stem.
- Branchlet.* The growth of the last season on any stem.
- Bristle.* A stiff hair.
- Bud.* An undeveloped stem with undeveloped leaves, or flowers, or both.
- Bud scales.* Small, dry, modified leaves covering a bud.
- Bundle scars.* Small marks on a leaf scar where the vascular bundles (conducting strands) passed from the stem and connected with the veins in the leaf.
- Capsule.* A dry, dehiscent fruit developed from a compound ovary.
- Catkin.* A spike of unisexual flowers, each borne in the axil of a bract.
- Chambered.* (Pith) interrupted by hollow spaces or regions of looser tissue.
- Ciliate.* Fringed with hairs.
- Collateral buds.* Accessory buds at the sides of the axillary bud.
- Compound leaf.* A leaf whose blade is divided into separate parts called leaflets.
- Conc.* A spike-like cluster of scales bearing naked seeds.
- Connate.* Grown together.
- Cordate.* (Leaves) with 2 rounded lobes at the base, and a deep sinus between them, where the stalk is attached.
- Corolla.* Collective name for the petals.
- Crenate.* Scalloped, or with rounded teeth.
- Deciduous.* Falling off; applied to leaves which drop off in the autumn of their first year.
- Decurrent.* (Leaf) extending down the stem below the place of insertion.
- Decussate.* Arranged in pairs which alternate with each other at right angles, making four vertical ranks.
- Dehiscent.* Splitting open when ripe.
- Dioecious.* Having staminate and pistillate flowers on separate plants.
- Downy.* Covered with short, soft hairs.
- Drupe.* A stone fruit, the fleshy part surrounding a stone which encloses the seed, as in the peach.
- Elliptic.* About twice as long as wide, and with the general outline of an ellipse, the two ends about the same width.
- Entire.* With an even margin, not toothed or divided.
- Evergreen.* (Leaves) remaining green through the winter.
- Exfoliating.* Peeling off in layers.
- Exotic.* Of foreign origin and not naturalized.

*Folcote.* Sickle- or scythe-shaped; flat with parallel, curved edges.

*Fascicle.* A bundle or close cluster.

*Fluted.* With rounded ridges.

*Fruit.* A ripened ovary or seed vessel.

*Glabrous.* Smooth, i.e., without hairs.

*Glond.* A secreting organ, embedded, or mounted on a stalk, or tipping a hair or tooth; or any protuberance resembling such an organ.

*Glandular.* Furnished with glands.

*Gloucons.* Covered with a white or bluish bloom, which rubs off, as on plums.

*Globose.* Spherical or nearly so.

*Hairy.* With fairly long hairs.

*Holf-evergreen.* (Leaves) remaining green through part of the winter.

*Imbricated.* Overlapping.

*Indehiscent.* Not splitting open when ripe.

*Internode.* The part of the stem between two nodes.

*Involute.* A group of modified leaves around a flower or flower cluster.

*Keeled.* With a central ridge, like the keel of a boat.

*Lanceolate.* Shaped like the head of a lance; much longer than wide, tapering to a point at the upper end, and slightly narrowed at the base.

*Loteral.* Situated on the side.

*Leader.* The trunk of a tree.

*Leaf bud.* A bud containing leaves and stem, but no flowers.

*Leaf scar.* A scar left where a leaf fell from the stem.

*Lcaftlet.* One of the parts of a compound leaf.

*Legume.* A dry fruit formed from a simple ovary, and splitting into 2 valves when ripe, as the pea pod.

*Lenticel.* A raised dot, a region of loose aerating tissue in the bark.

*Linear.* Long and very narrow, with parallel margins.

*Lobe.* A segment of a leaf whose margin is too deeply cut to be called toothed.

*Midrib.* The central vein of a leaf.

*Mixed bud.* A bud containing both leaves and flowers.

*Monoecious.* Having staminate and pistillate flowers on the same plant.

*Mucronate.* Abruptly tipped with a short, blunt point.

*Multiple fruit.* A structure composed of the fruits of several flowers so close together as to appear as a single fruit.

*Naked.* Not covered: (*bud*) without specially modified, covering scales; (*catkin*) not enclosed in a bud; (*seed*) not enclosed in an ovary.

*Needle.* A long, slender, more or less needle-shaped leaf.

*Node.* A place on the stem where one or more leaves are (or were) borne.

*Nut.* A hard, mostly one-seeded, indehiscent fruit, larger than an achene.

*Ob lanceolate.* Lanceolate with the tapering point toward the base.

*Oblong.* Longer than wide, with margins nearly parallel.

*Obovate.* Ovate with the narrow end toward the base.

*Obtuse.* Blunt or rounded at the end.

*Opposite.* (Leaves or axillary buds) two at a node, inserted on opposite sides of the stem at the same level.

*Oval.* Broadly elliptical, less than twice as long as wide.

*Ovary.* The part of the flower in which the seeds will be formed; *compound ovary*, one composed of 2 or more parts.

*Ovate.* With the general outline of a lengthwise section of an egg, with the wider end toward the base.

*Polmate.* Resembling a hand: *palmately veined*, with three or more veins about the same size arising from the same

- point at the base of the blade; —*lobed*, with sinuses pointing toward the petiole; —*compound*, with leaflets all attached to the tip of the petiole.
- Panicle*. An elongated, loose, branching or compound flower cluster.
- Papilionaceous*. With flowers constructed like those of the sweet pea.
- Pappus*. The modified calyx in the **Compositae** Family.
- Parallel veined*. With veins nearly parallel, from the base to the tip of the leaf.
- Parasitic*. Getting food partly or wholly from another living organism.
- Parted*. (2-, 3-, etc.-parted): too deeply cut to be called lobed, but not deeply enough to be called compound.
- Pendulous*. Drooping.
- Persistent*. Remaining on; not deciduous; applied to leaves, pubescence, etc.
- Petal*. One of the modified leaves (usually bright-colored) forming the inner circle of leaf-like parts of a flower, next to and surrounding the stamens.
- Petiole*. The stalk of a leaf.
- Phyllotaxy*. The arrangement of leaves on the stem.
- Pinnate*. Resembling a feather; *pinnately veined*, *lobed*, or *compound*, with veins, lobes, or leaflets arranged along the sides of a central axis, midrib or rachis. *Twice pinnate*. Pinnately compound of leaflets which are also pinnately compound.
- Pistil*. The central organ of a flower, in the base (ovary) of which the seeds will be formed.
- Pistillate*. Having one or more pistils, but no stamens.
- Pith*. The softer, central part of a stem.
- Pollen*. A powder, usually yellow, discharged from the enlarged tips (anthers) of the stamens of a flower.
- Prickle*. A slender, sharp-pointed outgrowth from the young bark or epidermis.
- Pubescent*. Bearing hairs of some sort, soft and fine ones particularly.
- Raceme*. A cluster of stalked flowers on an elongated axis.
- Racemose*. Raceme-like.
- Rachis*. The axis of a compound leaf (or of a spike).
- Receptacle*. The tip of the stem (usually somewhat enlarged) on which the parts of the flower are borne.
- Resin duct*. A lengthwise or transverse canal which carries resin.
- Rhombic*. With 4 nearly equal sides, but not rectangular.
- Samara*. A winged fruit.
- Scale*. (1) A very small leaf, usually appressed and often dry; e.g., modified leaves that cover buds; modified leaves on cones and catkins.  
(2) A tiny flattened outgrowth from the epidermis.  
(3) A flake of bark.
- Serrate*. Saw-toothed; with sharp teeth pointing forward.
- Sessile*. Without a stalk.
- Shoot*. Stem and leaves.
- Shrub*. A woody plant branched from the base, usually less than 8 ft. tall.
- Simple*. Not branched; not compound.
- Sinus*. The indentation between two lobes.
- Spike*. A cluster of sessile flowers borne close together on an elongated axis.
- Spine*. A sharp-pointed, rigid outgrowth from the stem, a modified branch or leaf or part of leaf.
- Stamen*. One of the pollen-bearing organs of a flower.
- Staminate*. Having stamens but no pistils.
- Stipules*. Small appendages occurring in pairs at the bases of the petioles of the leaves of certain plants.
- Stipule scar*. A scar left on the stem where a stipule fell.
- Striate*. Marked with lengthwise stripes or ridges.
- Strigose*. With appressed bristles.
- Subpetiolar*. Underneath the base of the petiole.

*Subtended by.* Situated just above.

*Superposed buds.* Accessory buds above the axillary bud.

*Tendrils.* A thread-like organ (modified stem or leaf) which coils around a support.

*Terete.* Cylindrical.

*Thorn.* Usually a hardened, sharp-pointed branch.

*Tomentose.* Covered with a woolly felt (*tomentum*).

*Toothed.* With short projections between shallow notches on the margin.

*Tree.* A woody plant usually with one main trunk and reaching a height of at least 8 feet and a diameter of at least 2 inches.

*Trunk.* The main stem of a tree.

*Twig.* A small branch, usually including several years' growth.

*Umbel.* Umbrella-like flower cluster; with flower stalks all from one point, the tip of the axis.

*Unisexual.* Staminate or pistillate.

*Valvate.* With edges meeting and not overlapping.

*Valve.* One of the pieces into which a dehiscent fruit splits.

*Veins.* Strands of conducting tissue forming the framework of leaves.

*Whorl.* A circle of three or more (leaves or buds) around the stem.

*Wing.* A thin expansion of, or appendage to, an organ.

*Woolly.* Covered with long, entangled, soft hairs.

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